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**Sent:** Wednesday, September 12, 2018 7:25 AM

**To:** Liscio, Matthew P CIV SEA 04, NAVSEA DET RASO [matthew.liscio@navy.mil]

**CC:** Howard, Leslie A CIV NAVFAC SW [leslie.howard@navy.mil]; Fowler, Janet CIV NAVSEA, SEA 04N [janet.fowler1@navy.mil]; Johnson, Nels [Nels.Johnson@aptim.com]; Schul, Raymond [raymond.schul@aptim.com]; Guillory, Jeffrey [jeffrey.guillory@aptim.com]; Amy Mangel [amy.mangel@aptim.com]; Hanelt, Norm [Norm.Hanelt@aptim.com]; Killpack, Randall [randall.killpack@aptim.com]; Chi, Minhsec [minhsec.chi@aptim.com]; Orman, Sean [sean.orman@aptim.com]; Rogers, Bryon [bryon.rogers@aptim.com]

**Subject:** [Non-DoD Source] Data package ready for review - HPNS PE-2, RSY C4 (DC)

**Attachments:** HPNS APTIM RSY C4 (DC) Soil Non-LLRW Concurrence Request 09122018 (reduced).pdf

Mr. Liscio,

APTIM request RASO concurrence to designate this soil as Non-LLRW soil.

If there are any questions or if additional data is required, please contact me.

Thank you.

**LAURA WHITTAKER**

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## Hunters Point Naval Shipyard, Parcel E-2 RSY Data Report

Contract No. EMAC III CTO-0013		
RSY Pad: C4	RSY Pad Use Number: Deconstruction (DC)	First Submittal <input checked="" type="checkbox"/> Second Submittal <input type="checkbox"/>
Data attached and submitted by: Laura Whittaker		Data Report Submittal Date: 09/12/2018

Soil Sample Data					
Sample Identification	Survey Location	Type of Sample	<sup>226</sup> Ra Final Analytical Results (pCi/g)	<sup>137</sup> Cs Final Analytical Results (pCi/g)	Total Sr Final Analytical Results (pCi/g)
Upper limit of site reference background			1.633	0.113	0.331
PE2-RSYC4-DC-S001	1	Systematic	0.682	-0.0441	0.0435
PE2-RSYC4-DC-S002	2	Systematic	0.758	0.00133	N/A
PE2-RSYC4-DC-S003	3	Systematic	0.531	0.0246	N/A
PE2-RSYC4-DC-S004	4	Systematic	0.581	0.0114	N/A
PE2-RSYC4-DC-S005	5	Systematic	0.620	0.00469	N/A
PE2-RSYC4-DC-S006	6	Systematic	0.574	-0.0599	N/A
PE2-RSYC4-DC-S007	7	Systematic	0.509	0.011	N/A
PE2-RSYC4-DC-S008	8	Systematic	0.515	0.0158	N/A
PE2-RSYC4-DC-S009	9	Systematic	0.637	-0.0494	N/A
PE2-RSYC4-DC-S010	10	Systematic	0.545	-0.0431	N/A
PE2-RSYC4-DC-S011	11	Systematic	0.638	0.0314	-0.0143
PE2-RSYC4-DC-S012	12	Systematic	0.642	0.0290	N/A
PE2-RSYC4-DC-S013	13	Systematic	0.666	0.00565	N/A
PE2-RSYC4-DC-S014	14	Systematic	0.457	0.00286	N/A
PE2-RSYC4-DC-S015	15	Systematic	0.908	0.0291	N/A
PE2-RSYC4-DC-S016	16	Systematic	0.733	-0.0453	N/A
PE2-RSYC4-DC-S017	17	Systematic	0.689	-0.0303	N/A
PE2-RSYC4-DC-S018	18	Systematic	0.660	0.0388	N/A

<sup>226</sup>Ra Radium-226  
<sup>137</sup>Cs Cesium-137  
 Sr Strontium  
 pCi/g Picocuries per gram

Instrument and Survey Data										
Activity	Survey #	Date	Meter	Calibration Due Date	Serial #	Reference Area Static Bkgd	Reference Area Static 3 IL	Reference Area Scan Bkgd	Reference Area Scan 3 IL	Range
RSI Gamma Walkover Survey	HPRS-08032018-PE2-ROV2-2882	08/03/2018	RS-701/R SX-1	N/A	Console: 7236 Detectors: 5447,5448	N/A	N/A	3,400 CPS	4,872 CPS	3,524-4,851 CPS
RSI Follow-up Static Survey	HPRS-08082018-PE2-JSS2-2895	08/08/2018	RS-701/R SX-1	N/A	Console: 7236 Detectors: 5447,5448	3,612 CPS	4,255 CPS	N/A	N/A	3,822-4,563* CPS
Systematic Sample Survey	HPRS-08012018-PE2-JSS-2871	08/01/2018	2221	06/29/2019	117634	15,069 CPM	17,241 CPM	N/A	N/A	17,297-20,000* CPM

+ Gamma readings exceeding the Reference Area 3 IL are attributable to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil—see Note(s) in the Summary table (page 2) for more details.

3 IL Investigation Level (established at 3 above the mean of the Reference Area dataset)

CPS Counts per second

CPM Counts per minute

Summary
<p>1) RSI gamma walkover survey and data review—upon review of initial scan data, follow-up static investigations were deemed necessary, and investigation locations were identified as per the RSI Data Evaluation Process (pages 3-4). Gamma scan coverage is shown on the Systematic Sample Survey map (page 8). Contour maps of scan data are shown on RSI Data Plots (page 5). Data review results are summarized on RSI Review Summary (page 6).</p>
<p>2) RSI Follow-up static survey—31 locations identified during the data review process were investigated, with readings less than the Reference Area static IL at all locations for regions of interest (ROIs) 3, 6, 7, and 8 (VD1). Follow-up locations are shown on the RSI Follow-up Static Survey map (page 7).</p> <p><u>Note:</u> Gamma readings reported in the Instrument and Survey Data table (page 1) for gamma walkover and follow-up static surveys show the mean gamma gross count rate range (ROI 10, VD1) for all surveyed follow-up locations. Gamma walkover scan activity exceeding the Reference Area IL for ROI 10 (gross counts) is due to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil. Count rates in all radionuclide-specific ROIs (3, 6, 7, and 8) were less than the radionuclide-specific Reference Area static ILs for all follow-up investigation locations.</p>
<p>3) Eighteen systematic soil samples (001-018) were obtained and submitted for gamma spectroscopy analysis. Sample locations for systematic samples are shown on the Systematic Sample Survey map (page 8). TestAmerica sample results are attached (pages 42-65).</p> <p>Ten percent of the systematic soil samples (two samples in total, PE2-RSYC4-DC-S001 &amp; PE2-RSYC4-DC-S011) were also analyzed for total strontium. Total Strontium results are also included in the TestAmerica sample results report (pages 42-65).</p> <p><u>Note:</u> Static gamma measurements collected at systematic and biased sample locations were obtained with a handheld Ludlum 2221 Scaler/Ratemeter and 3"x3" NaI probe; the results show gamma readings exceeding the instrument-specific Reference Area Static IL at several sample locations. Sample results indicate that this activity is due to the presence of naturally-occurring non-Navy program radionuclides in the excavated soil.</p>
<p><b>Conclusions:</b></p> <p><b>All locations with elevated Z-scores identified by the RSI gamma walkover survey were determined to be consistent with background. 31 locations were investigated during the follow-up static survey, with readings less than the Reference Area static IL at all locations for ROIs 3, 6, 7, and 8 (VD1). Spectral analysis results and gamma static data for each region of interest (ROI) are provided (pages 9-39).</b></p> <p><b>Final analytical results for systematic samples from this RSY pad are concluded to be comparable to background. Histograms showing soil sample activity concentrations are provided (pages 40-41). Ten percent of the systematic soil samples (two samples in total, PE2-RSYC4-DC-S001 &amp; PE2-RSYC4-DC-S011) were also analyzed for total strontium, with concentrations less than the Project Action Limit of 0.331 pCi/g, as shown in the Soil Sample Data table (page 1).</b></p> <p><b>This data package characterizes the construction base layer for RSY C4 pad. The soil was initially import clean material.</b></p> <p><b>APTIM request RASO concurrence to release this soil as Non-LLRW.</b></p> <p><b>Disposition: This soil shall be dispositioned as non-LLRW waste. The soil will be stockpiled onsite for reuse following appropriate chemical characterization.</b></p>

## RSI Data Evaluation Process

### RS-700 Mobile Radiation Monitoring System

- Self-contained gamma-ray radiation detection and monitoring system
- (2) RSX-1 4-liter NaI(Tl) gamma detectors oriented perpendicular to the direction of travel (VD1 denotes both detectors summed; VD3 refers to the left detector; and VD4 refers to the right detector)
- Multi-Channel Analyzer, allowing for monitoring of energy-specific regions of interest (ROIs)
- RadAssist survey software for control, monitoring, and recording

Ten ROIs have been established for radium and progeny, cesium, and cobalt, as well as other naturally-occurring or anthropogenic gamma-emitting radionuclides that may be of interest:

ROI	Description	Energy Range (keV)	Primary Peak (keV)
1	Total counts	411 – 2811	N/A
2	Potassium	1371 – 1569	1460
3	U/Ra-226	1659 – 1860	1764 (Bi-214)
4	Thorium	2409 – 2811	2614 (Tl-208)
5	Annihilation	456 – 570	511
6	Ra-226	546 – 666	609 (Bi-214)
7	Cs-137	600 - 720	662
8	Pb-214/Ra-226	327 – 399	351
9	Co-60	1085 - 1370	1173/1332
10	Gross Counts	24 – 2811	N/A

A tiered approach is used during data review to identify follow-up locations. Raw data are exported to a comma delimited format using RadAssist and imported into an Excel spreadsheet for review and analysis. The following review steps are completed to determine if additional follow-up measurements are necessary:

- **Playback Review:** The data file is replayed in RadAssist and reviewed for elevated count rates in ROIs 6, 7, 9, and 10 for virtual detector (VD) 1 (both detectors summed). The scan screen is also monitored for elevated count rates and alarms.
- **Count Rate Time Series Review:** The count rates for ROIs 6, 7, 9, and 10 for VDs 1, 3 (detector 1), and 4 (detector 2) are plotted in a time series and reviewed for additional peaks in count rate.
- **All ROIs:**
  - **Z-Scores:** The Z-Scores are calculated for each location in all ROIs for VDs 1, 3, and 4. Any location with four or more ROIs having a Z-Score greater than three ( $Z > 3$ ) is marked for follow-up.
  - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in all ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with four or more ROIs having a local  $Z > 3$  is marked for follow-up.
  - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with four or more ROIs having a semi-local  $Z > 3$  is marked for follow-up.
- **ROIs 3, 6, 8, and 10 (radium-specific ROIs):**
  - **Z-Scores:** The Z-Scores are calculated for each location in the radium-specific ROIs for VDs 1, 3, and 4. Any location with three or more radium-specific ROIs having a  $Z > 3$  is marked for follow-up.
  - **Local Z-Scores:** Local Z-Scores are calculated using a moving average for each data point in the radium-specific ROIs for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a local  $Z > 3$  is marked for follow-up.
  - **Semi-local Z-Scores:** Semi-local Z-Scores are calculated using the global average, but with a moving average for the standard deviation for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise

be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) with three or more radium-specific ROIs having a semi-local  $Z > 3$  is marked for follow-up.

- ROI 7 (cesium-specific ROI):
  - Z-Scores: Z-Scores are calculated for each location in ROI 7 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 7 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi- local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 7 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- ROI 9 (cobalt-specific ROI):
  - Z-Scores: Z-Scores are calculated for each location in ROI 9 for VDs 1, 3, and 4. Any location having a  $Z > 3$  is marked for follow-up.
  - Local Z-Scores: Local Z-Scores are calculated using a moving average for each data point in ROI 9 for VDs 1, 3, and 4 to identify elevated count rates where the background is variable (e.g. multiple surface types). Any location (in a survey unit that meets this condition) having a local  $Z > 3$  is marked for follow-up.
  - Semi-local Z-Scores: Semi- local Z-Scores are calculated using the global average, but with a moving average for the standard deviation in ROI 9 for VDs 1, 3, and 4. This is used for survey data that have a consistent background but an area or areas of highly elevated count rates, in order to identify smaller areas of elevated count rates that may not otherwise be identified by the initial Z-score review. Any location (in a survey unit that meets this condition) having a semi-local  $Z > 3$  is marked for follow-up.
- Z-Score Time Series Review: The three types of Z-Scores for ROIs 6, 7, 9, and 10 for VDs 1, 3, and 4 are plotted in a time series and reviewed for additional peaks in Z-Scores.

Any location selected for follow-up or with a Z-Score  $> 3$  in a radium-, cesium-, or cobalt-specific ROI will undergo spectral analysis to determine if it is statistically likely that there are ROC concentrations present at that location in quantities greater than background.

A background spectrum is subtracted from the local spectral data for a given location, and the resulting net spectrum is plotted. Critical levels, as defined in Section 6.7.1 of the Multi Agency Radiation Survey and Site Investigation Manual are calculated and plotted based on background levels. The critical level is the level, in counts, at which there is a statistical probability (with a predetermined confidence) of incorrectly identifying a measurement system background value as greater than background. Any response above this level is considered to be greater than background. The critical level is calculated for ROIs 6, 7, 8, and 9 according to the equation shown below:

$$\text{Where: } \quad \quad \quad = 2.33$$

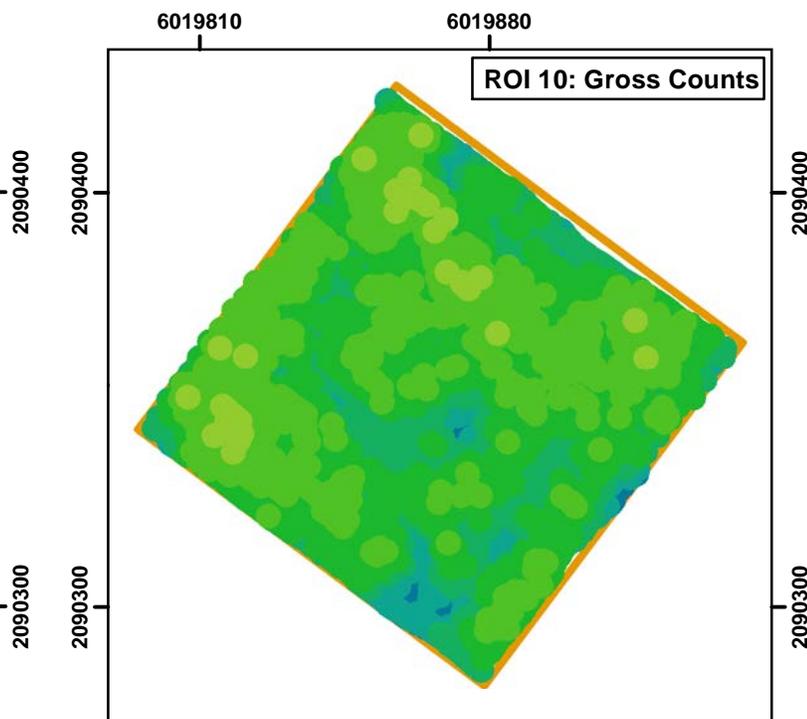
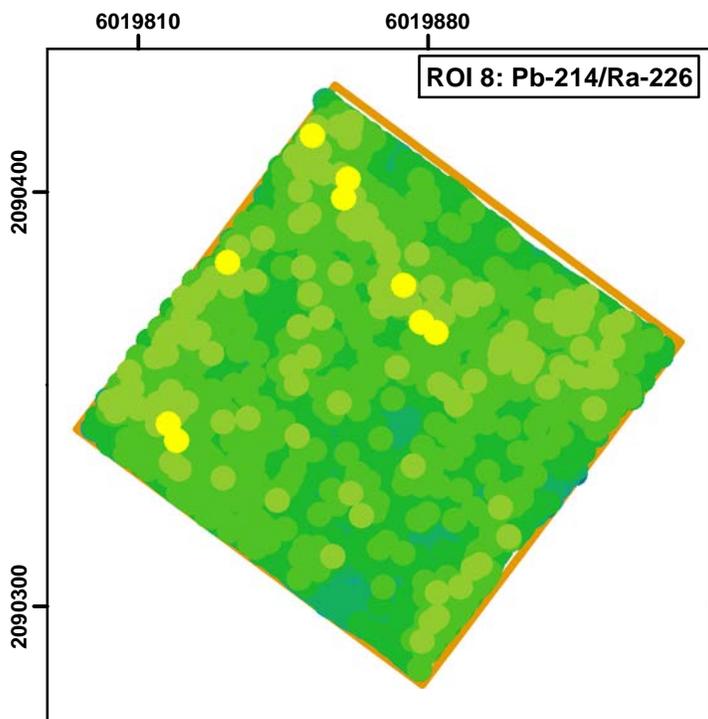
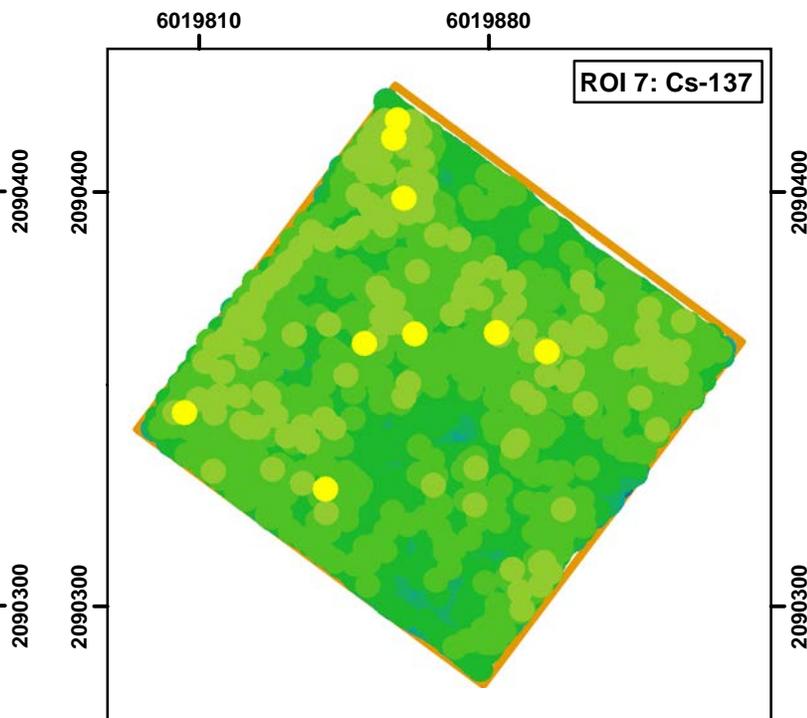
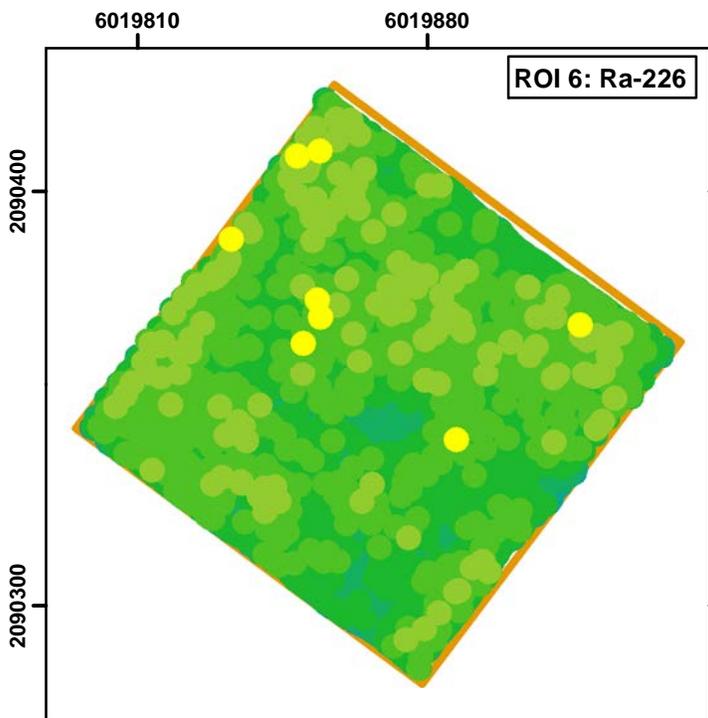
LC	=	critical level (counts)
B	=	average background in the ROI

When count rates in the net gamma spectrum at a given location do not exceed critical levels for any radium-, cesium-, or cobalt-specific energy ranges, it is unlikely that ROC concentrations exist at that location above background.

Any data point that is both above the critical level and within the energy range of a given ROI is considered above background for that radionuclide and will be flagged for further investigation in the field.

# HPNS Parcel E-2 RSY Pad C4 Deconstruction

Contour Map



### RS-700 Gamma Walkover Data (VD1)

- |  |  |
|--|--|
| <span style="color: yellow;">●</span> > 3 std dev            | <span style="color: green;">●</span> > -1 to < 0 std dev   |
| <span style="color: lightgreen;">●</span> > 2 to < 3 std dev | <span style="color: teal;">●</span> > -2 to < -1 std dev   |
| <span style="color: green;">●</span> > 1 to < 2 std dev      | <span style="color: blue;">●</span> > -3 to < -2 std dev   |
| <span style="color: darkgreen;">●</span> > 0 to < 1 std dev  | <span style="color: darkblue;">●</span> < -3 std dev   |
|  | <span style="border: 2px solid orange; display: inline-block; width: 15px; height: 10px;"></span> RSY Pad Boundaries |



Coordinate system: CSP Zone III, NAD83, US Survey Foot



## RSI Review Summary

### Summary:

31 locations were initially selected for follow-up investigation. Locations were identified by elevated peaks noted in the playback review and/or time series charts, and by using the Z-Score, Local Z-Score, and Semi-Local Z-Score reviews as described in the RSI Data Evaluation Process on pages 3-4. Spectral analyses performed on gamma static data at these locations do not indicate the presence of  $^{226}\text{Ra}$  or  $^{137}\text{Cs}$  above background. Gamma static readings at these locations are less than the Reference Area static IL for ROIs 3, 6, 7, and 8; figures are provided on pages 9-39.

### HPNS Parcel E-2 RSY Pad C4 (DC)

6019810

6019880

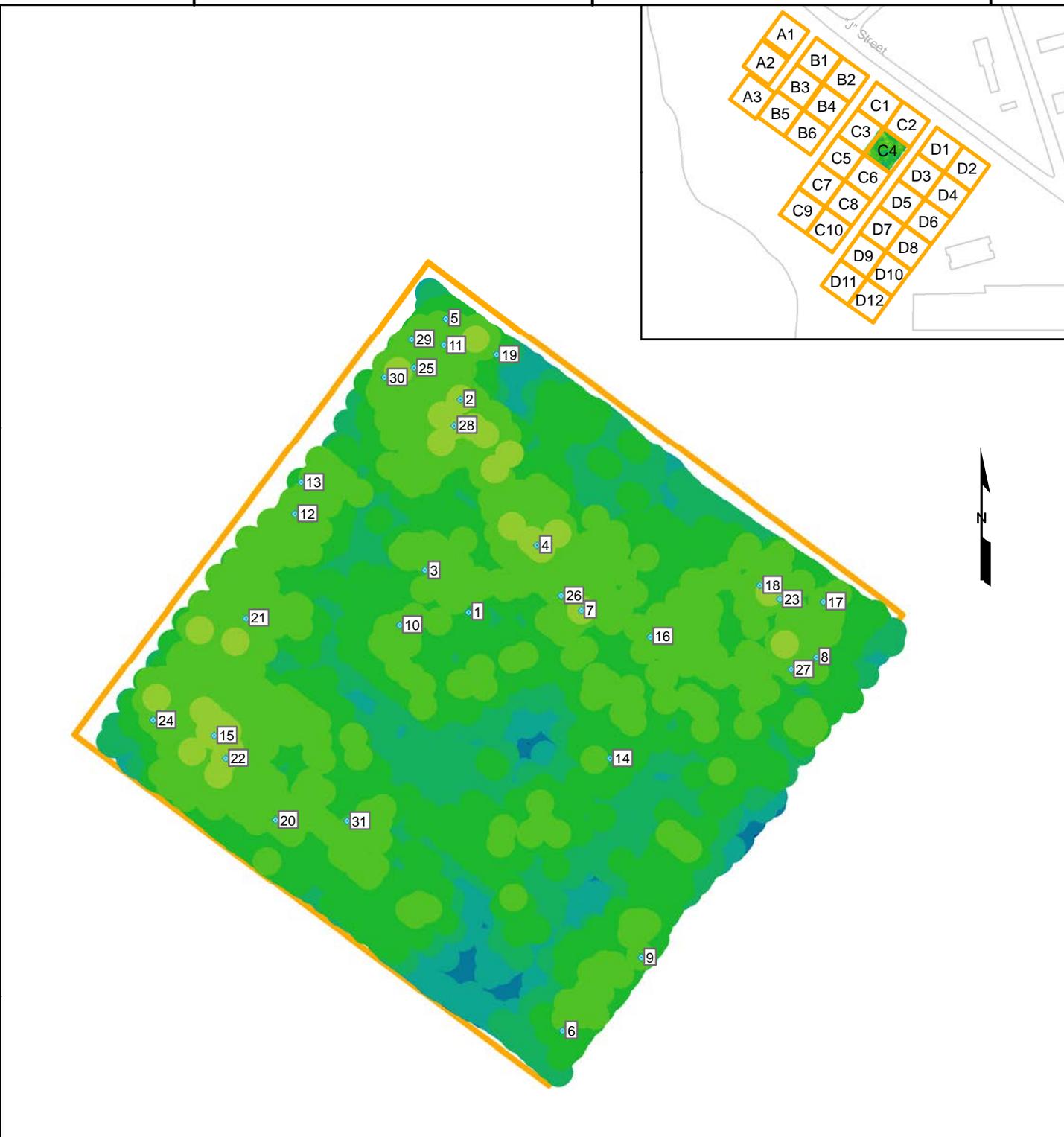
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2090400

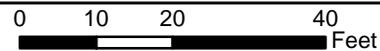
2090300

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**RS 700 Gamma Walkover Survey Data (VD1, ROI 10)**

- ◆ Follow-up Locations
- > 3 std dev
- > 2 to < 3 std dev
- > 1 to < 2 std dev
- > 0 to < 1 std dev
- > -1 to < 0 std dev
- > -2 to < -1 std dev
- > -3 to < -2 std dev
- < -3 std dev
- ▭ RSY Pad Boundaries



Coordinate system: CSP Zone III, NAD83, US Survey Foot



Systematic Sample Survey  
HPRS-08012018-PE2-JSS-2871

### HPNS Parcel E-2 RSY Pad C4-DC

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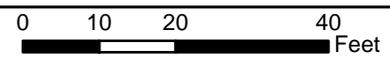
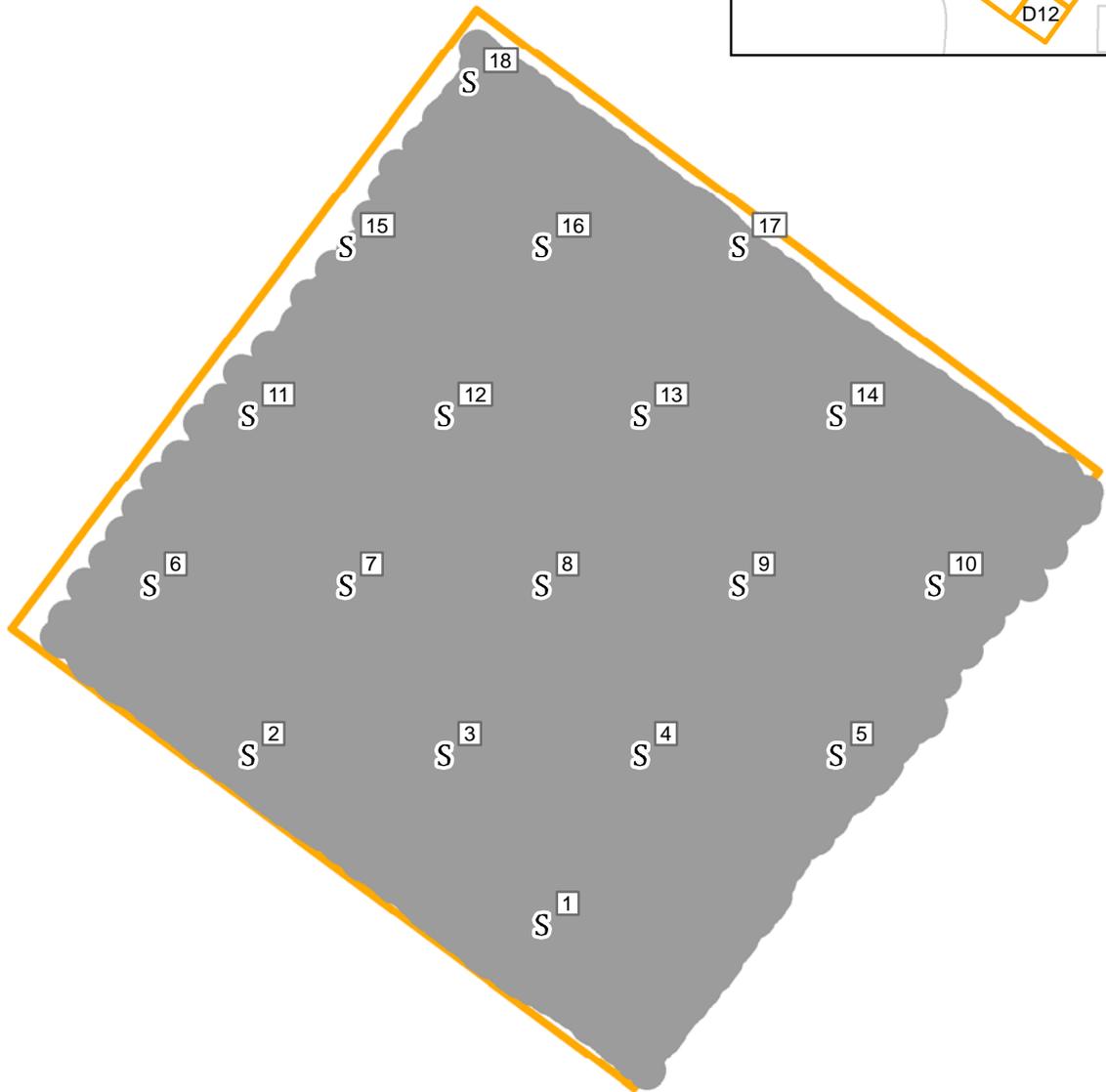
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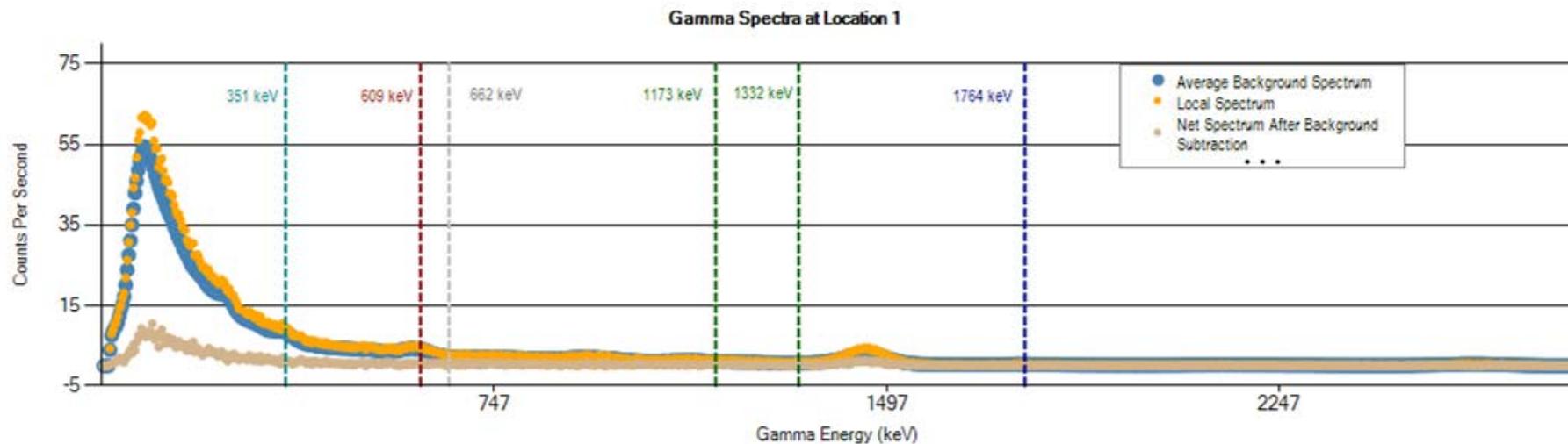
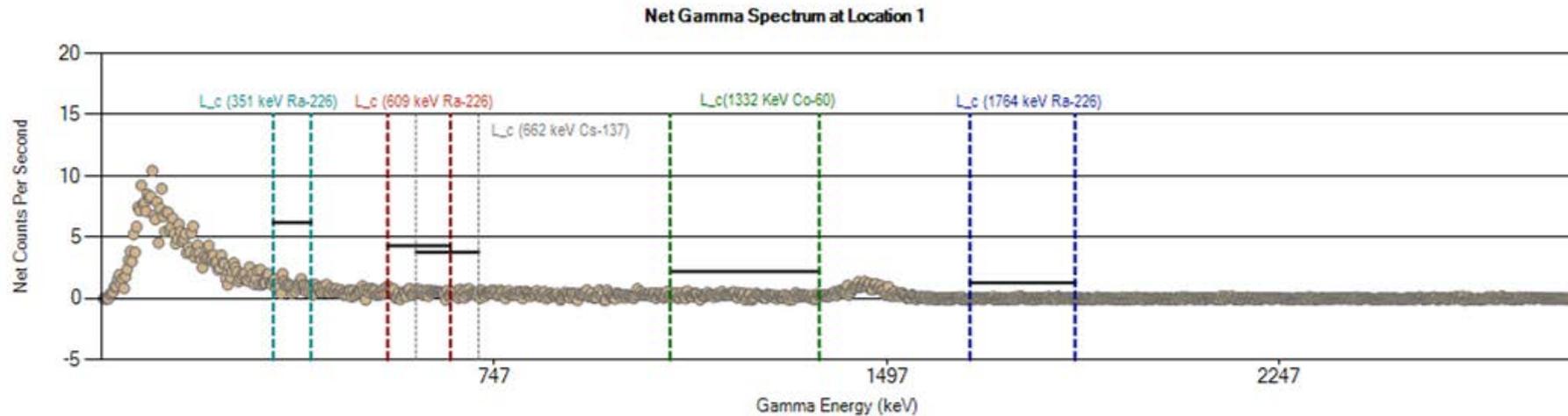


Coordinate system: CSP Zone III. NAD83, US Survey Foot

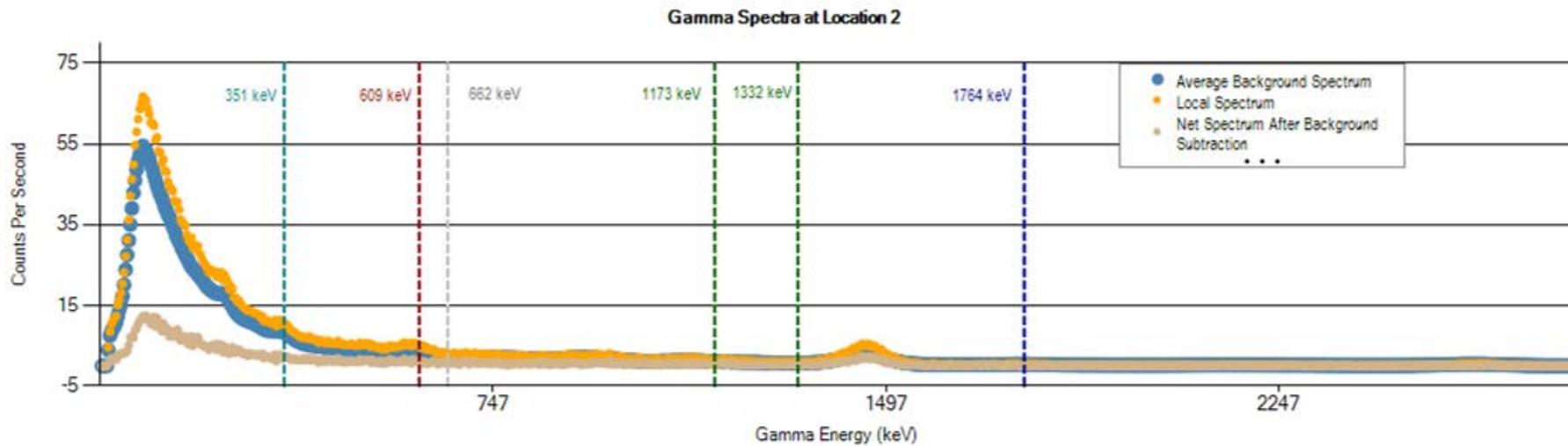
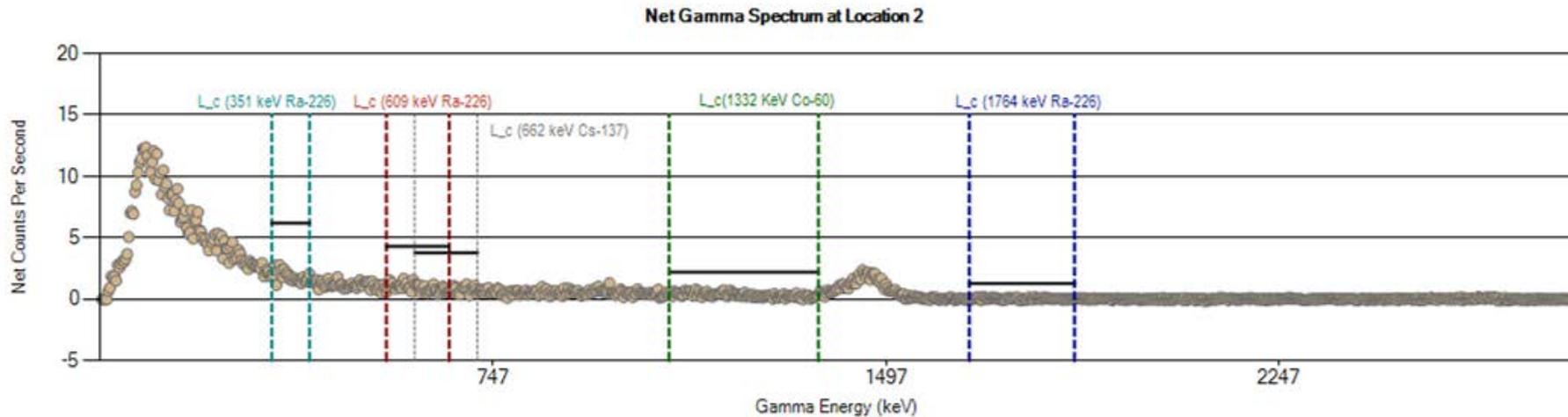
**Survey Instrument: Model 2221/ 44-20**  
**Serial Number: 117634**

-  Systematic Sample Locations
-  RS-700 GWS Scan Coverage
-  RSY Pad Boundaries



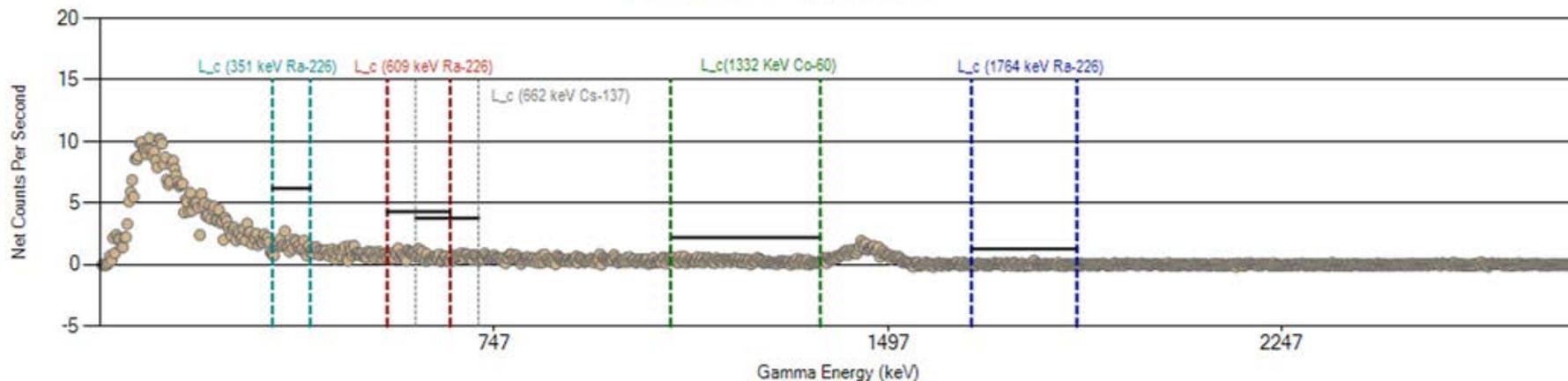


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 1 (cps)	1005	151	21	25	172	159	125	200	110	4180
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

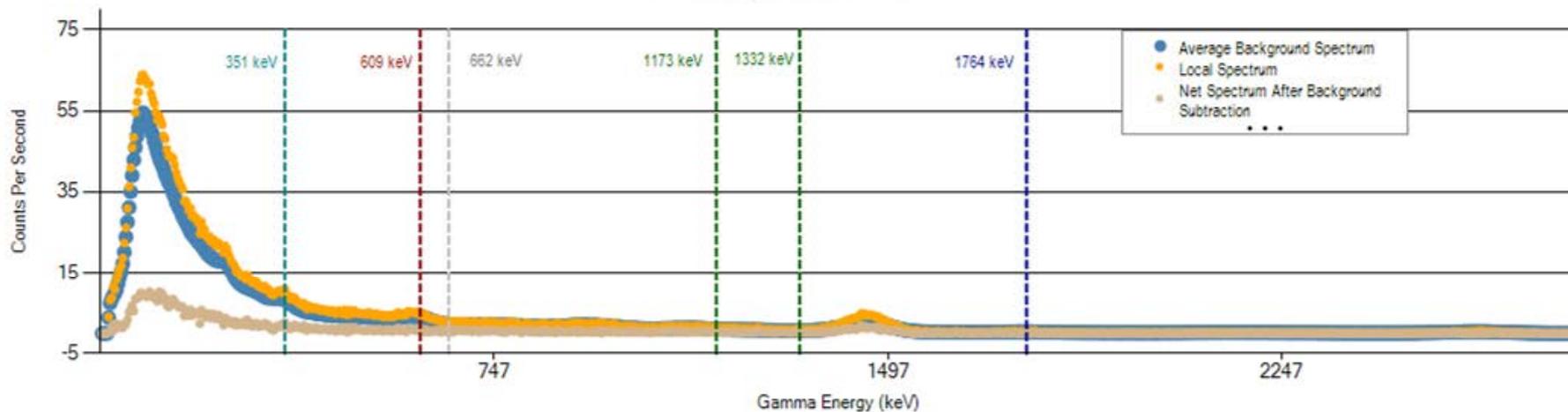


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 2 (cps)	<b>1133</b>	<b>178</b>	24	27	194	179	139	221	<b>122</b>	<b>4527</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

Net Gamma Spectrum at Location 3

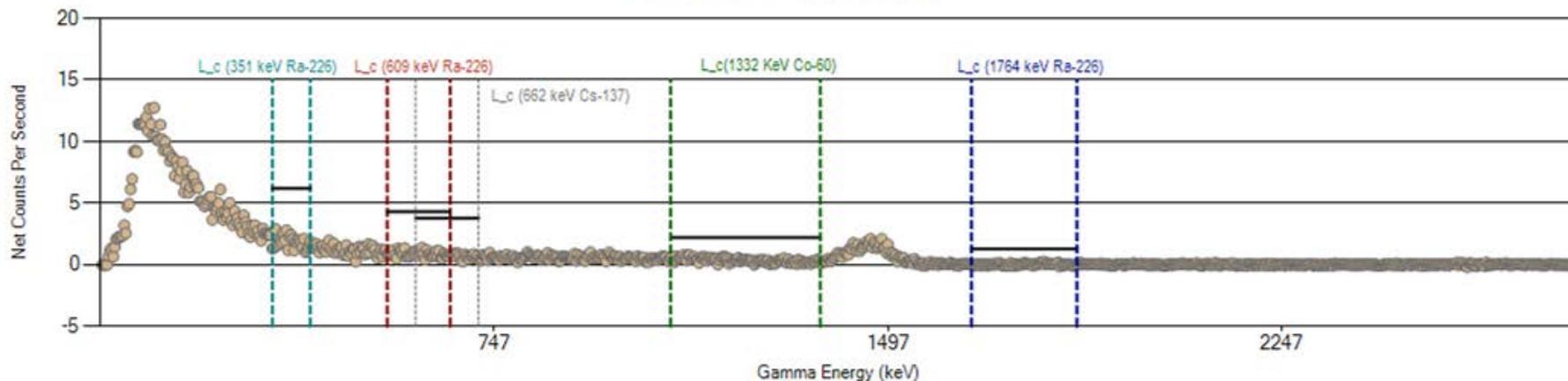


Gamma Spectra at Location 3

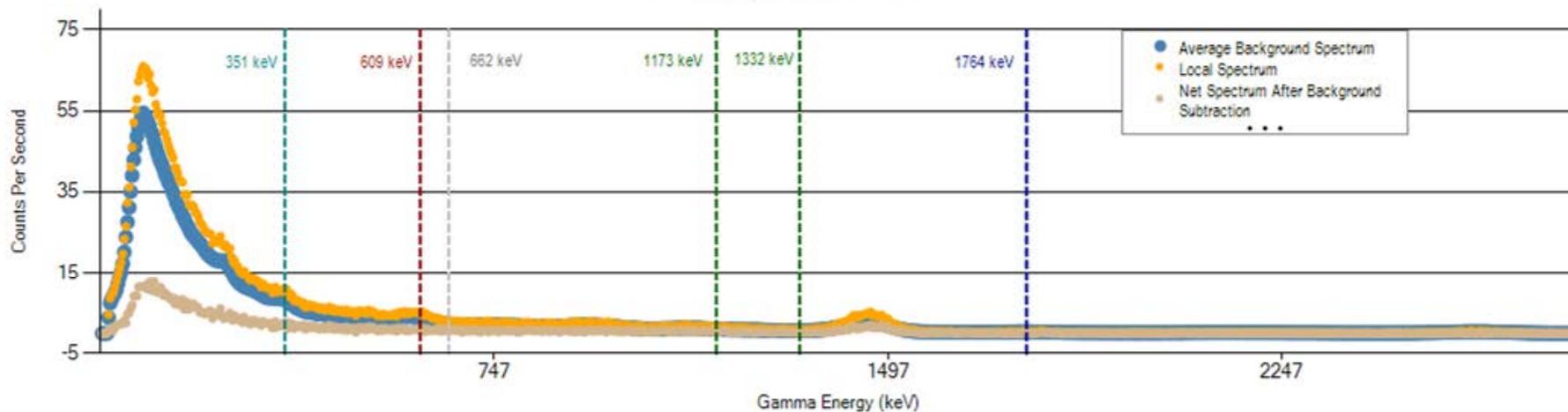


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 3 (cps)	<b>1069</b>	<b>163</b>	22	26	185	169	132	212	116	<b>4358</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

Net Gamma Spectrum at Location 4

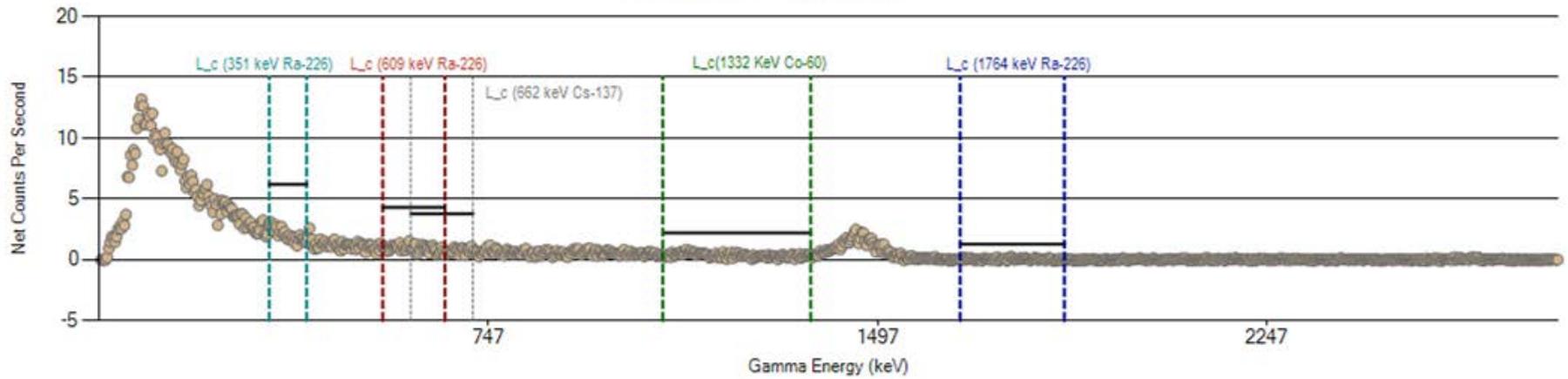


Gamma Spectra at Location 4

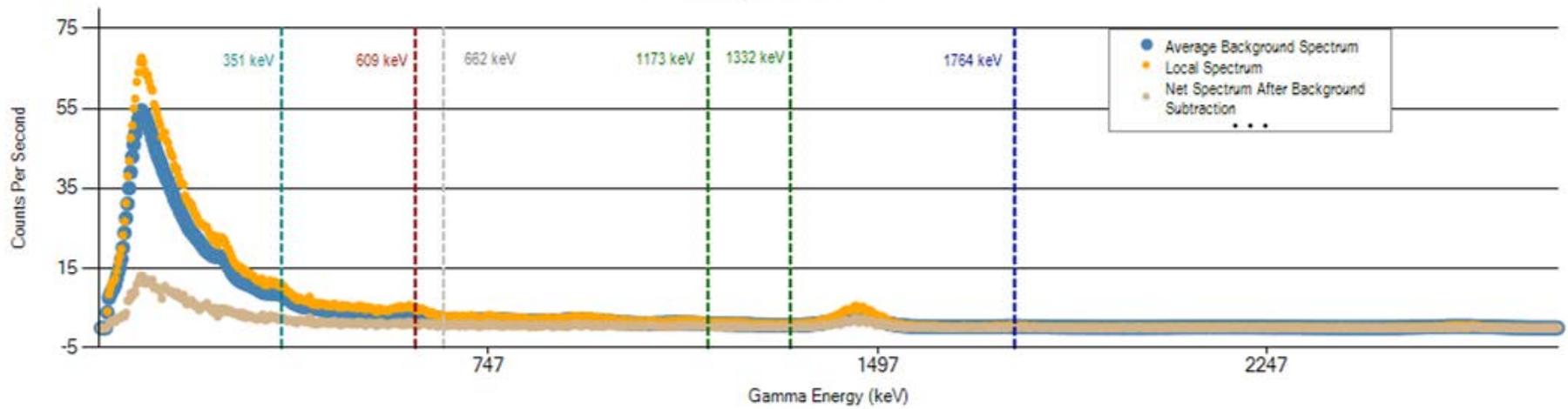


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 4 (cps)	<b>1128</b>	<b>173</b>	23	26	193	177	139	220	<b>124</b>	<b>4534</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

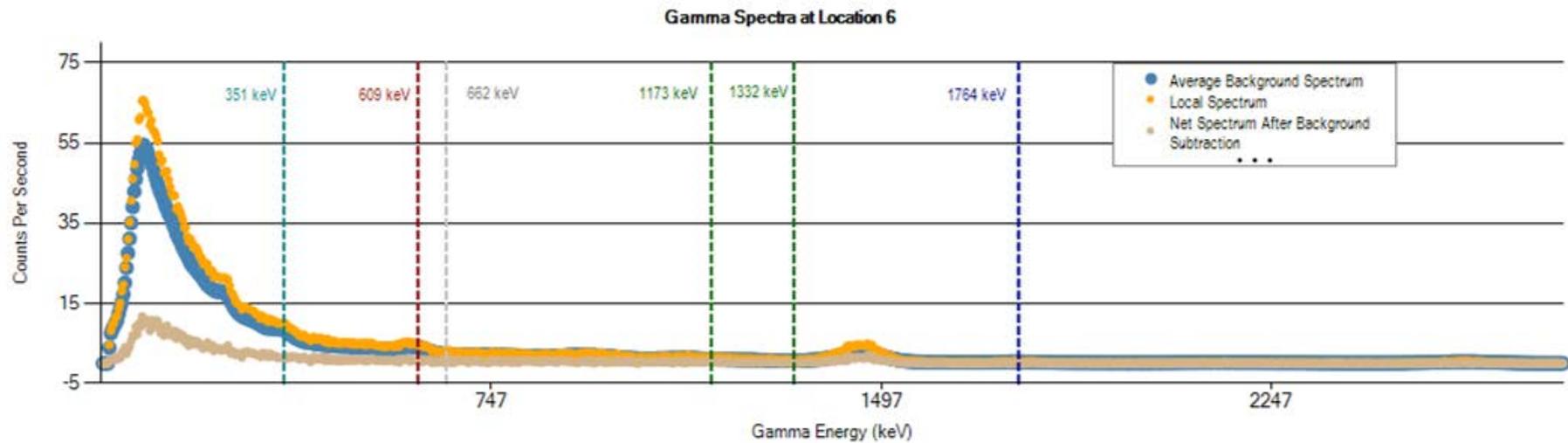
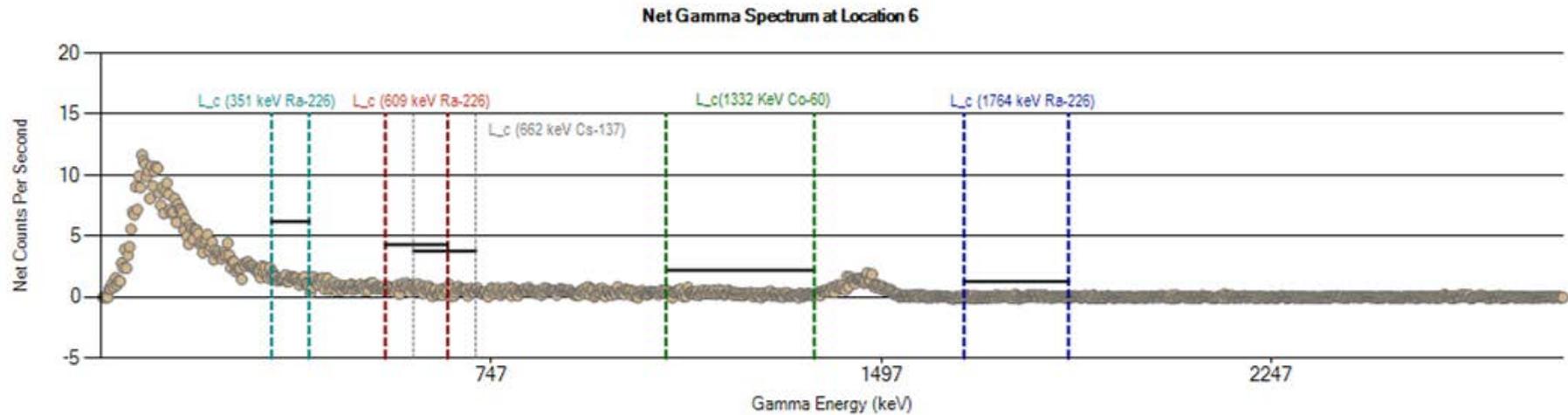
Net Gamma Spectrum at Location 5



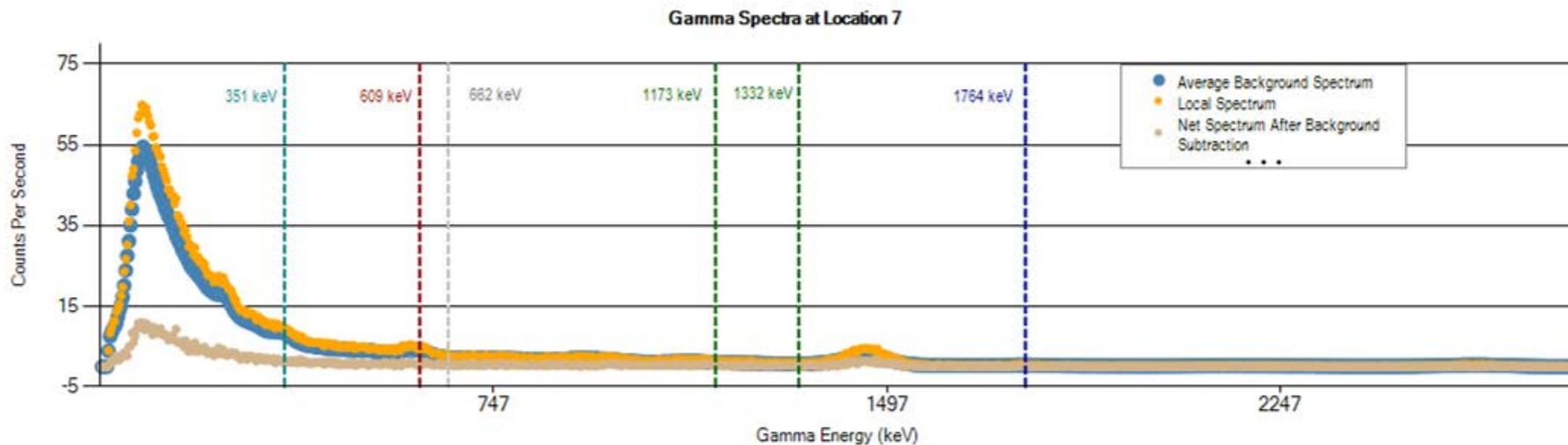
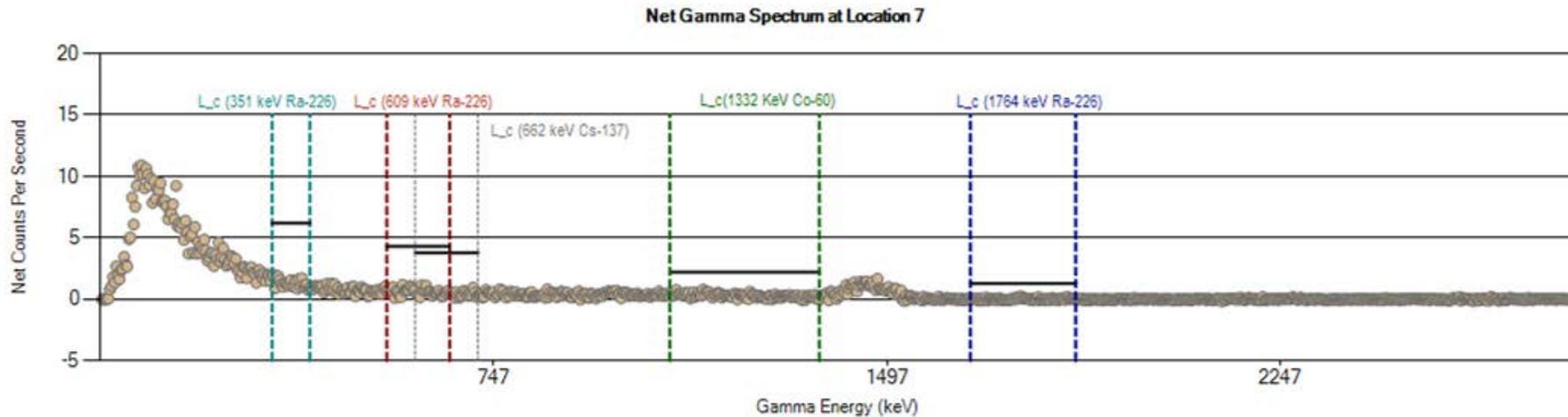
Gamma Spectra at Location 5



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 5 (cps)	1137	178	24	28	193	178	140	225	124	4558
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

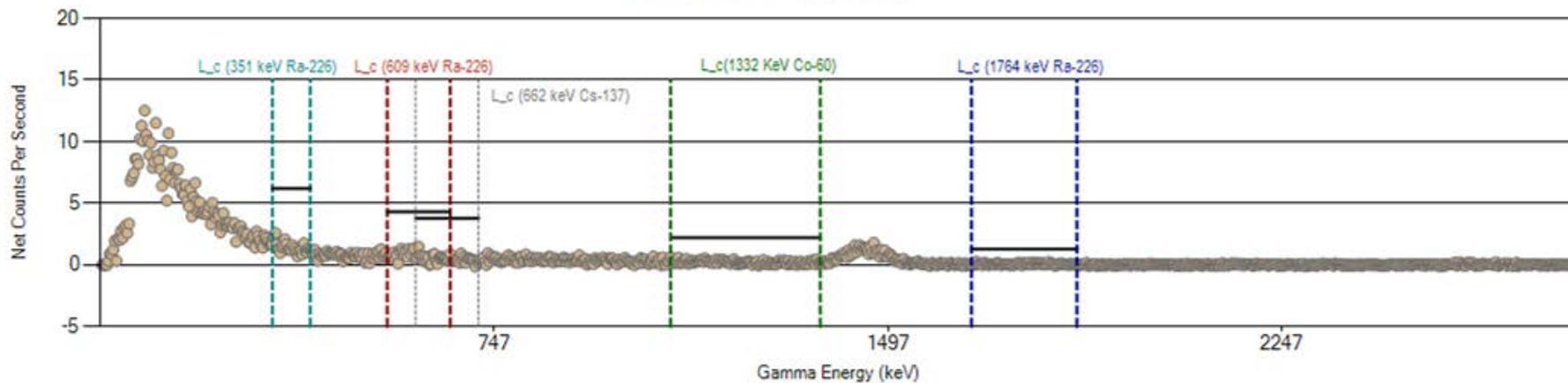


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 6 (cps)	<b>1068</b>	<b>163</b>	23	27	183	168	130	210	116	<b>4375</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

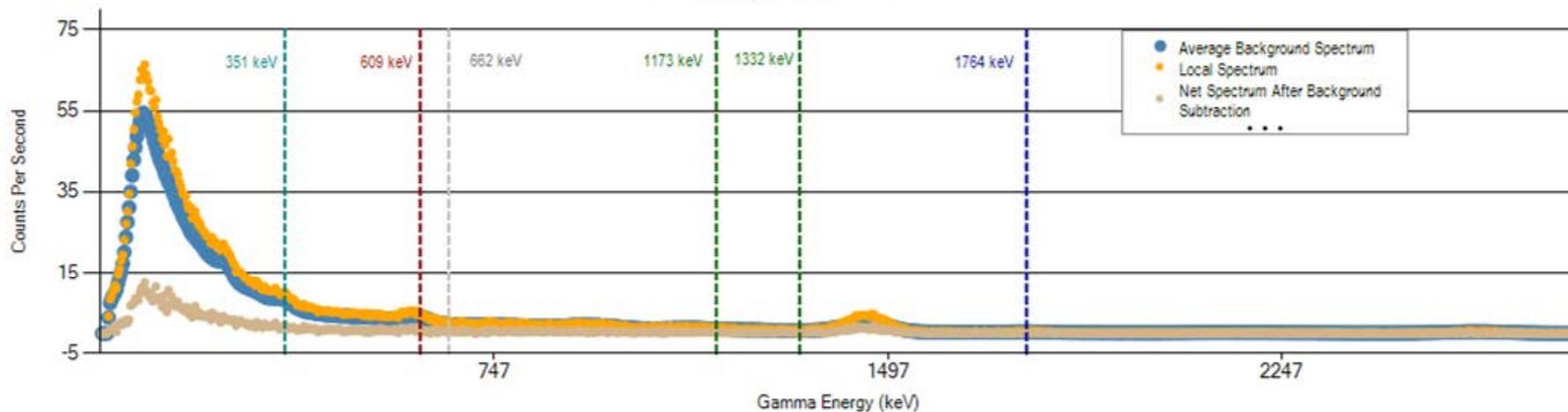


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 7 (cps)	1042	<b>157</b>	22	25	177	165	127	206	117	<b>4323</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

Net Gamma Spectrum at Location 8

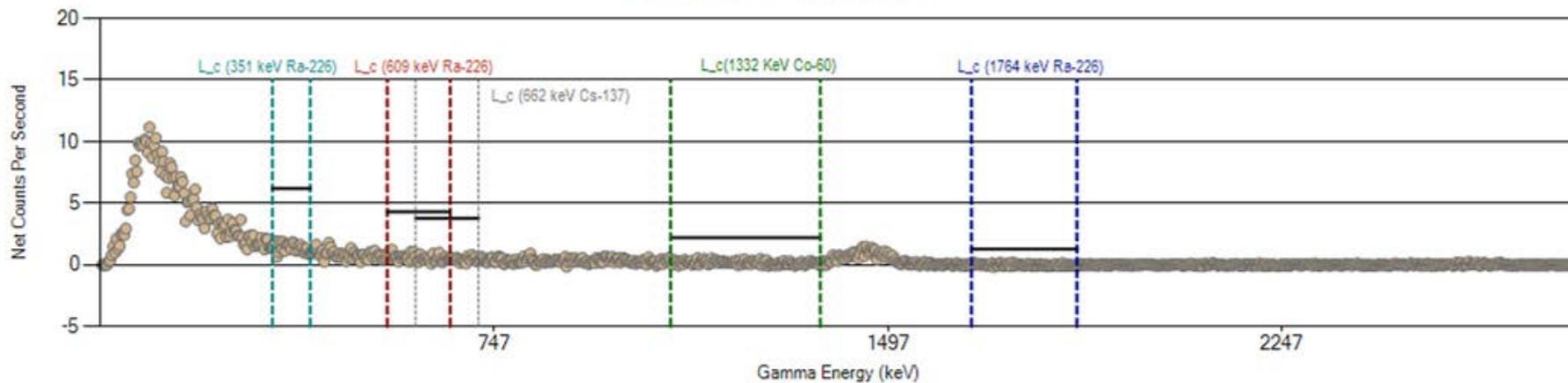


Gamma Spectra at Location 8

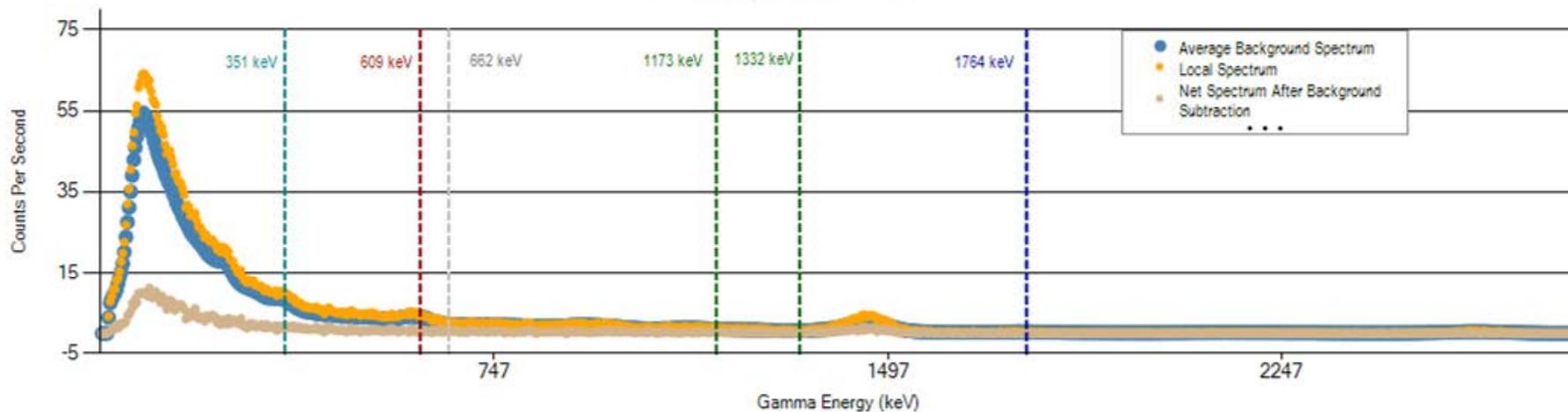


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 8 (cps)	1048	<b>159</b>	25	27	179	169	127	209	110	<b>4348</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

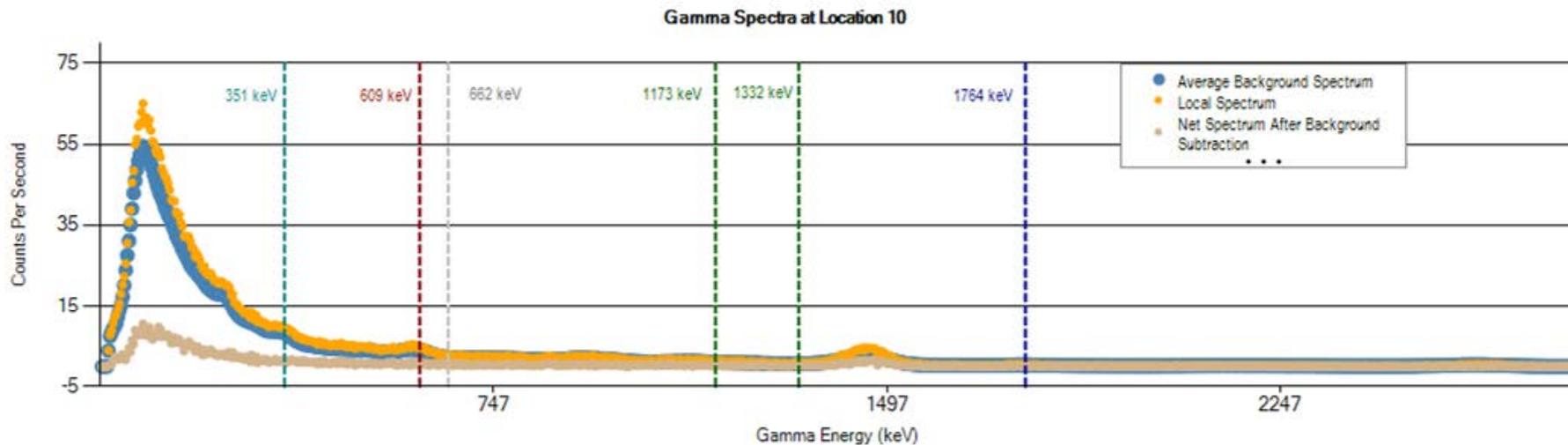
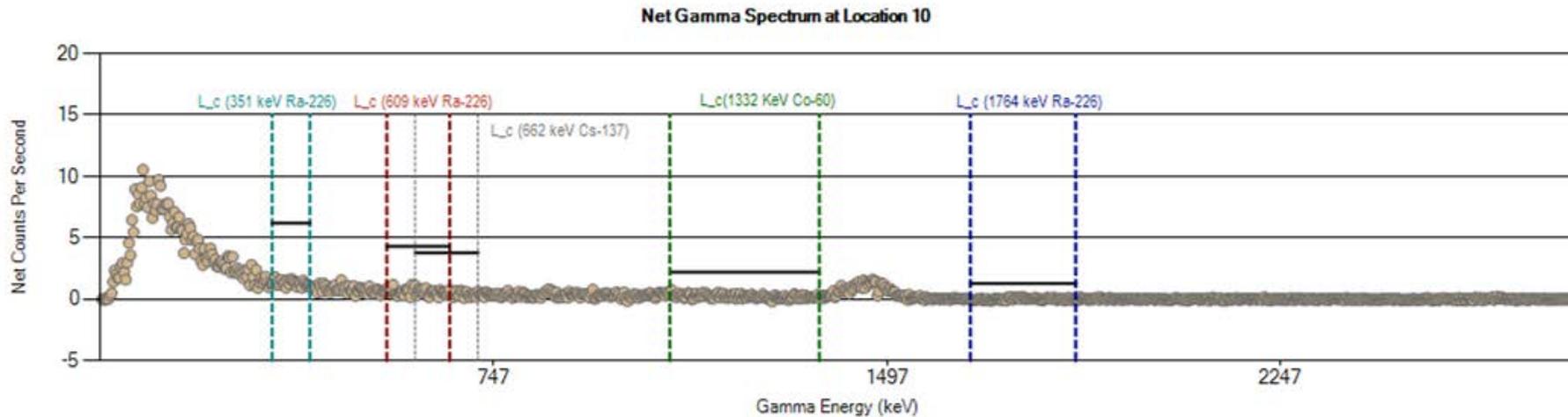
Net Gamma Spectrum at Location 9



Gamma Spectra at Location 9

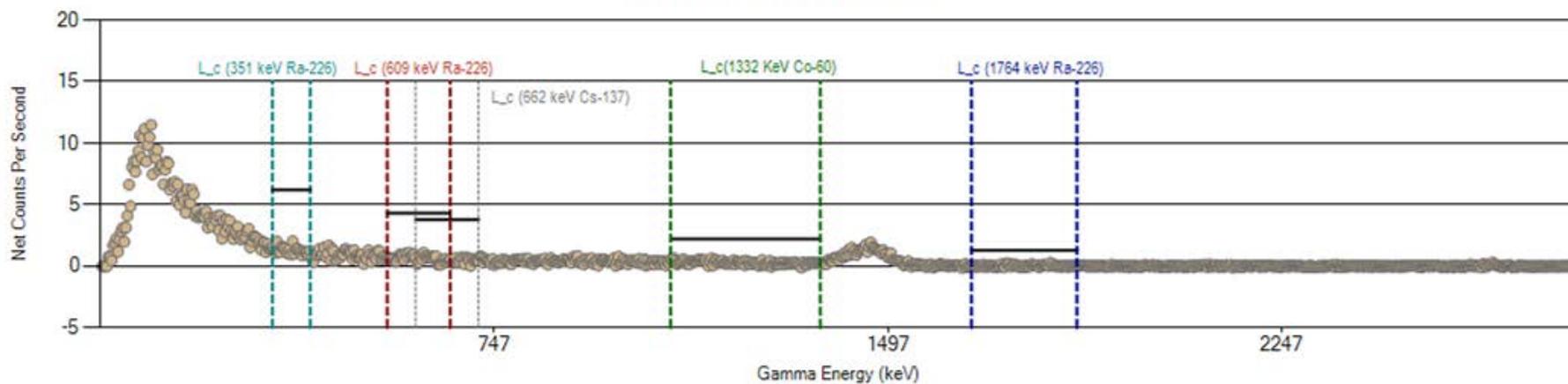


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 9 (cps)	1025	153	21	27	179	164	126	209	107	4299
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

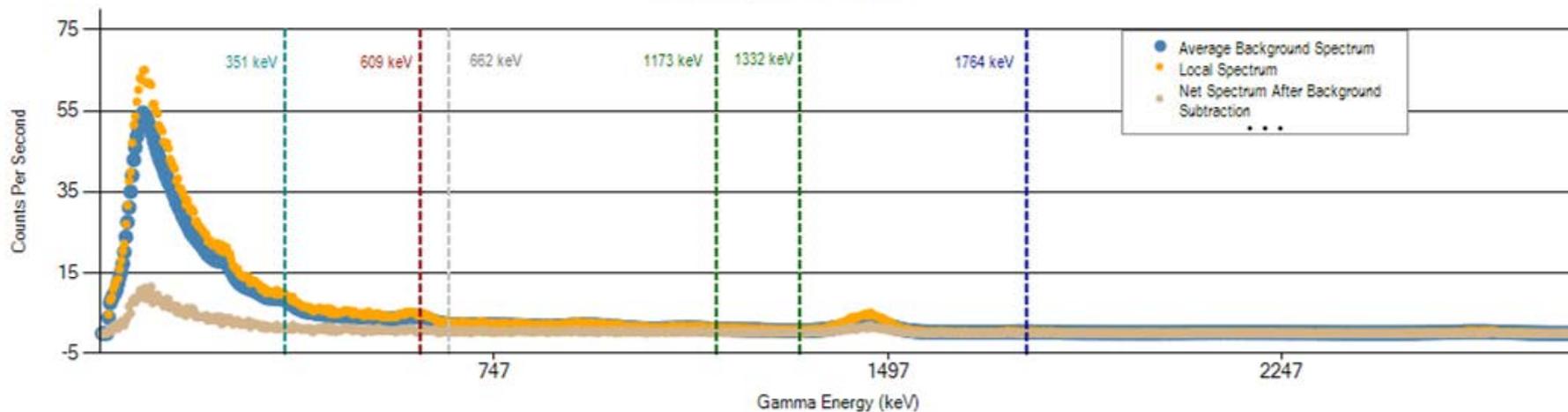


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 10 (cps)	1037	<b>158</b>	22	26	179	166	127	207	111	<b>4270</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

Net Gamma Spectrum at Location 11

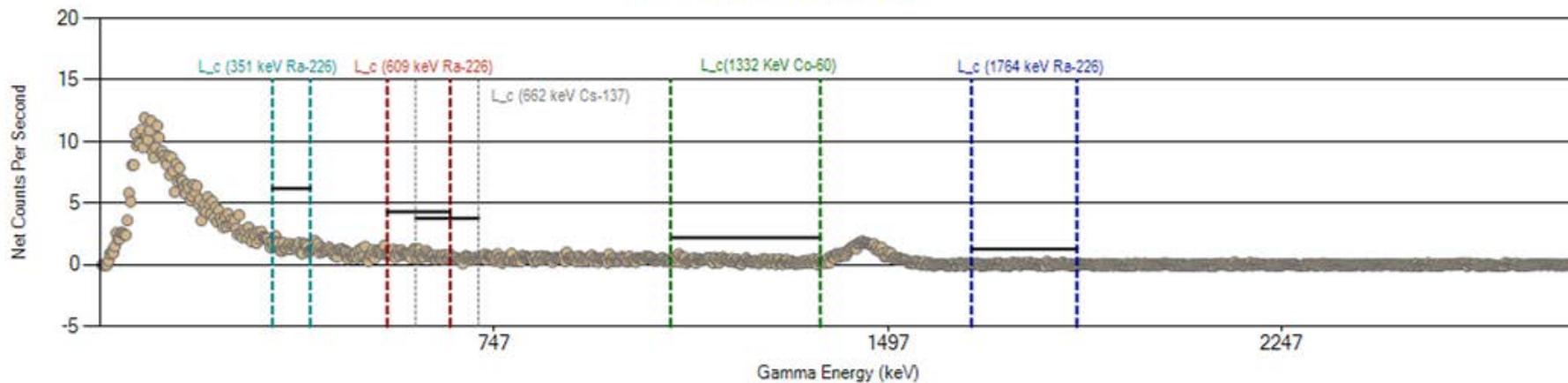


Gamma Spectra at Location 11

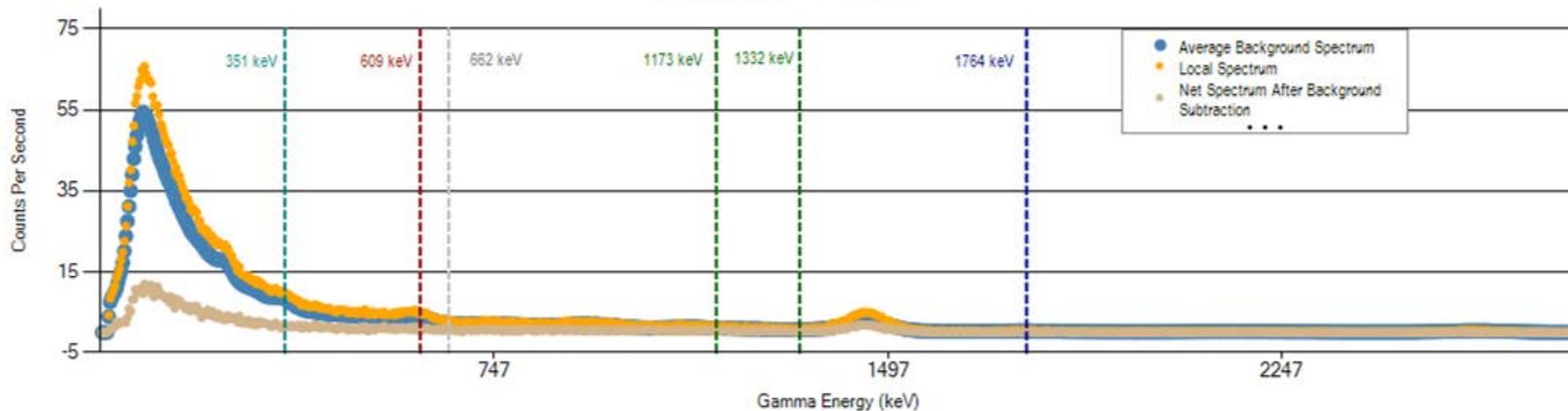


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 11 (cps)	1063	165	23	26	184	166	129	206	116	4339
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

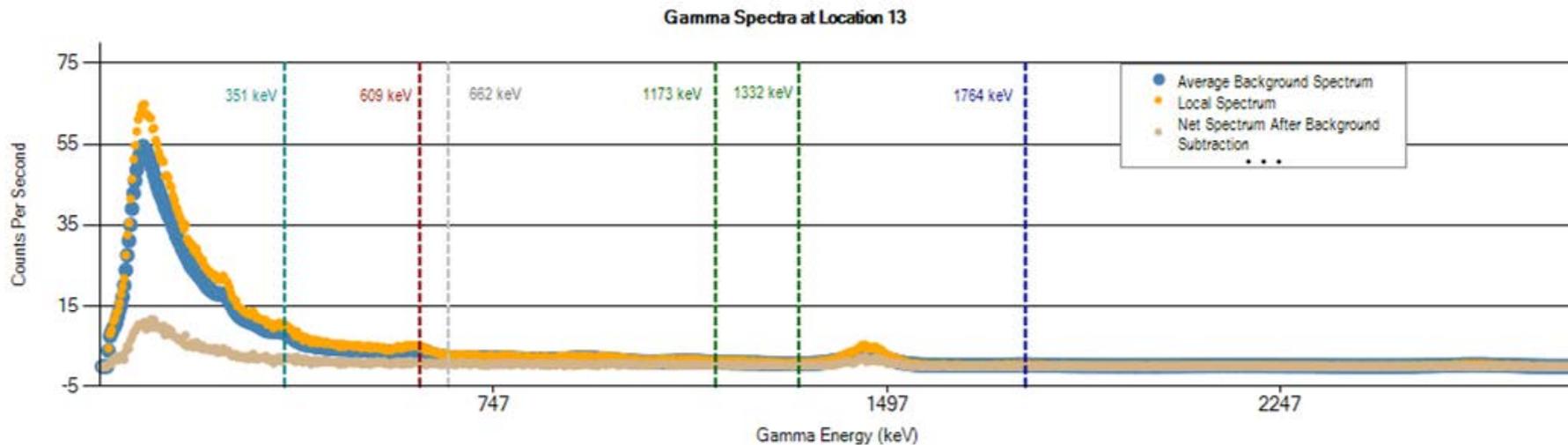
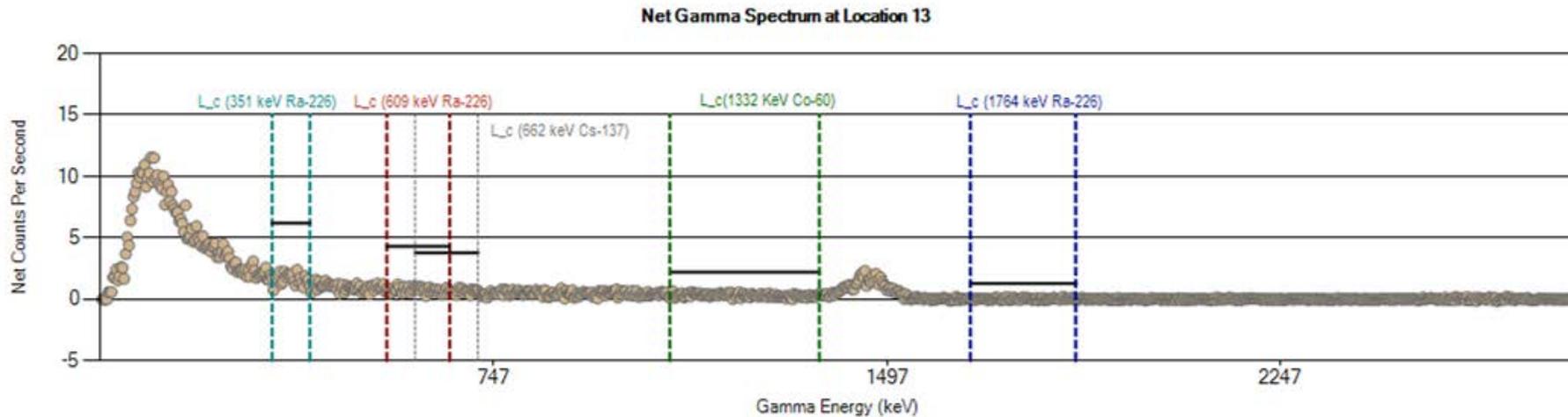
Net Gamma Spectrum at Location 12



Gamma Spectra at Location 12

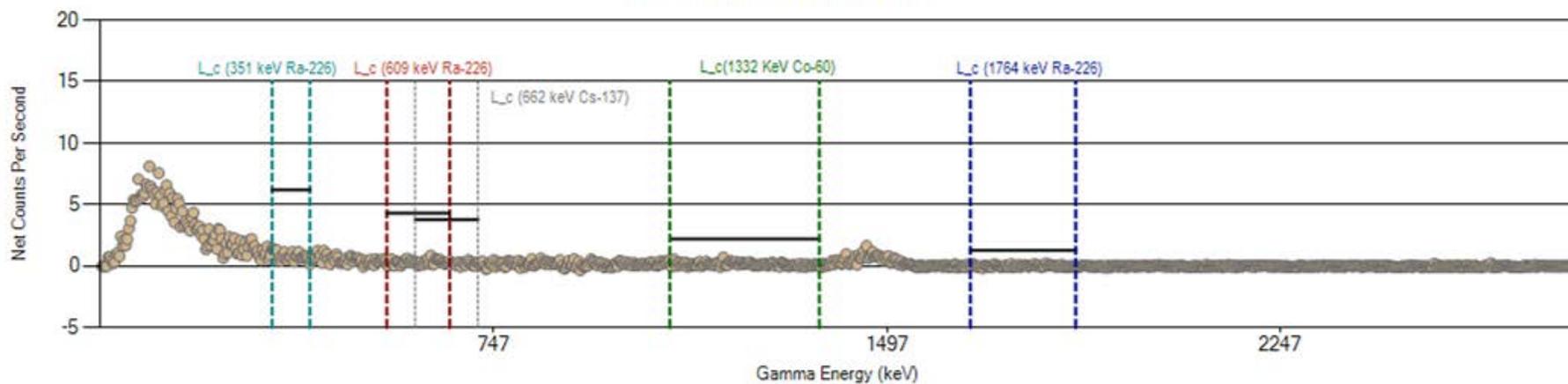


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 12 (cps)	<b>1098</b>	<b>171</b>	23	25	188	174	132	212	120	<b>4442</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

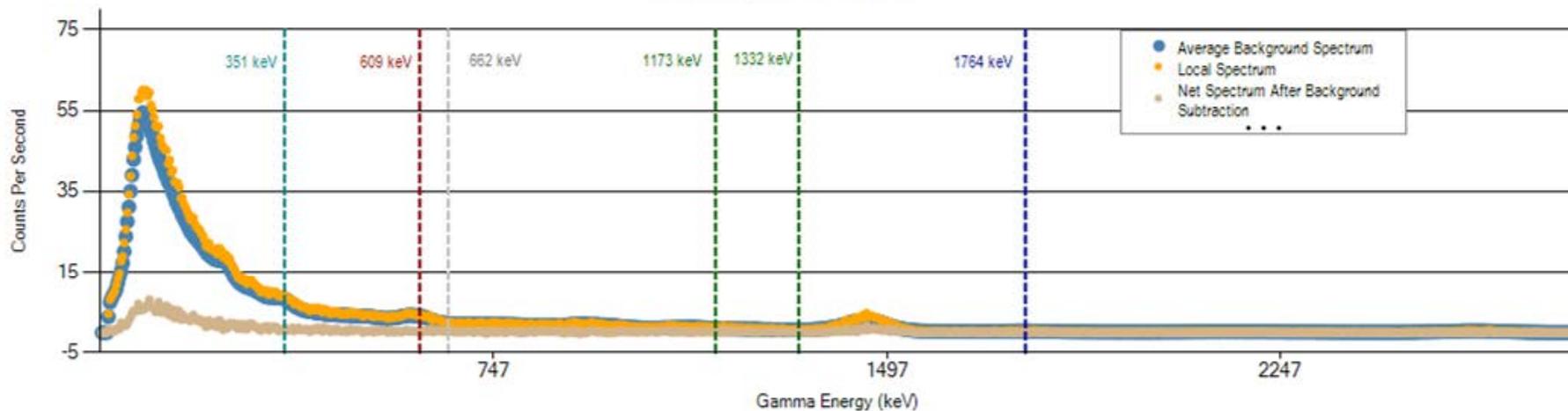


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 13 (cps)	<b>1092</b>	<b>170</b>	23	26	185	171	135	215	120	<b>4421</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

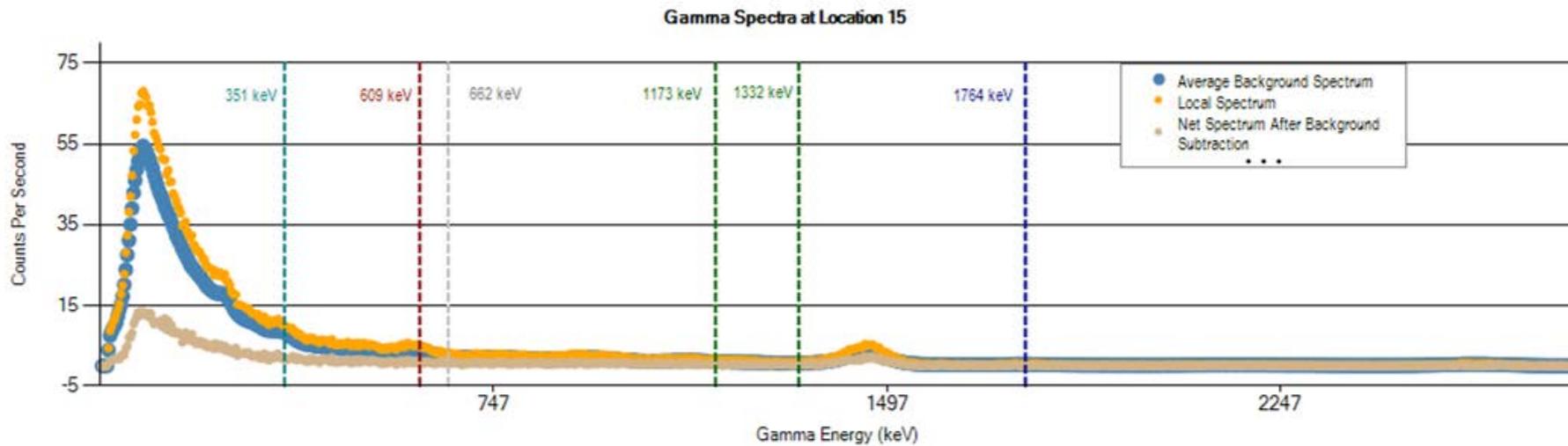
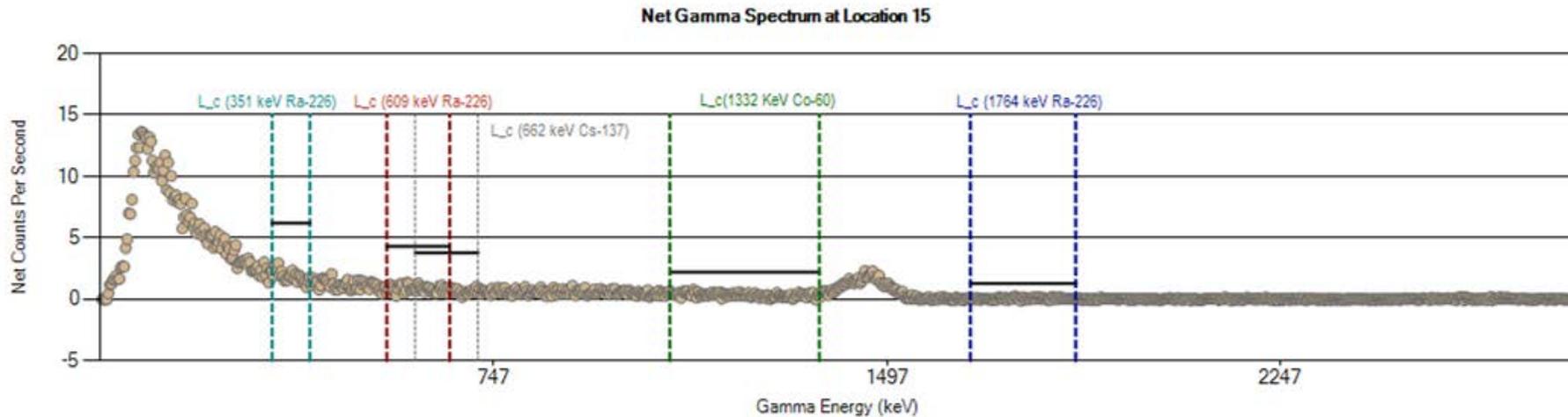
Net Gamma Spectrum at Location 14



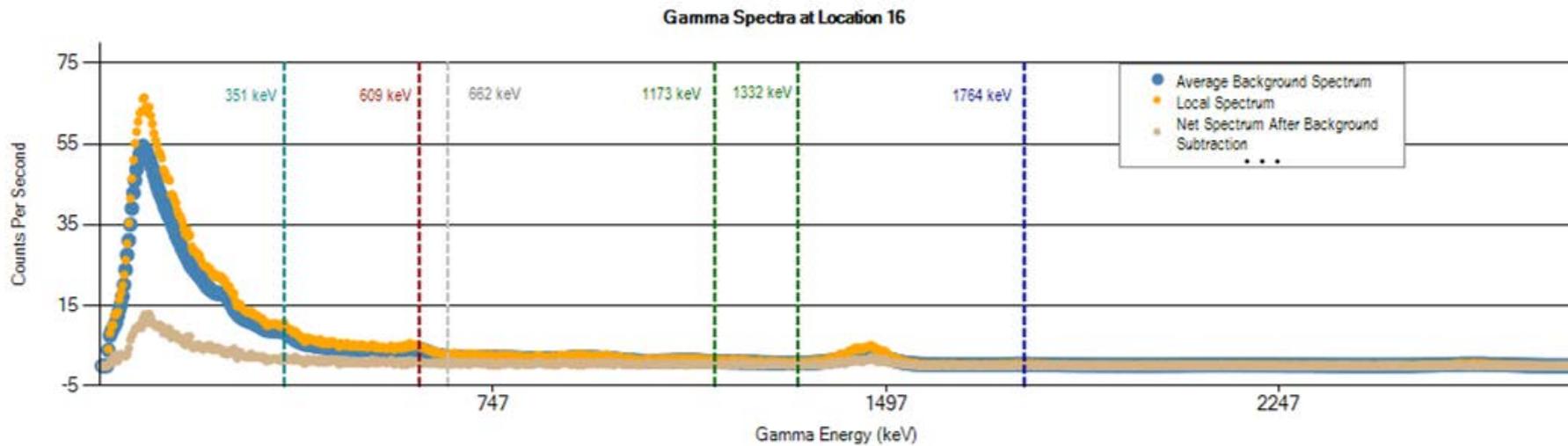
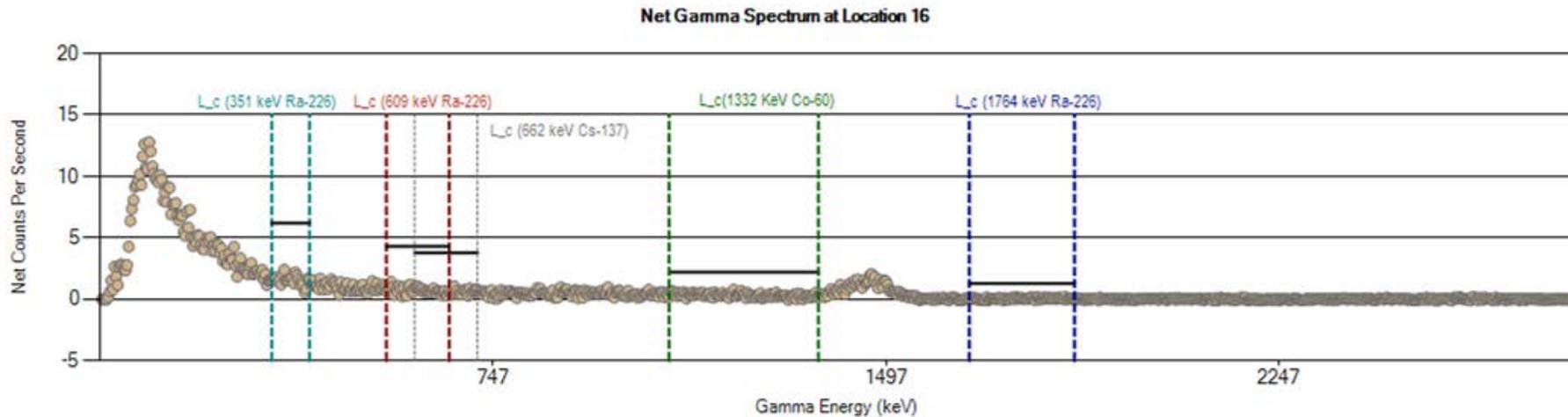
Gamma Spectra at Location 14



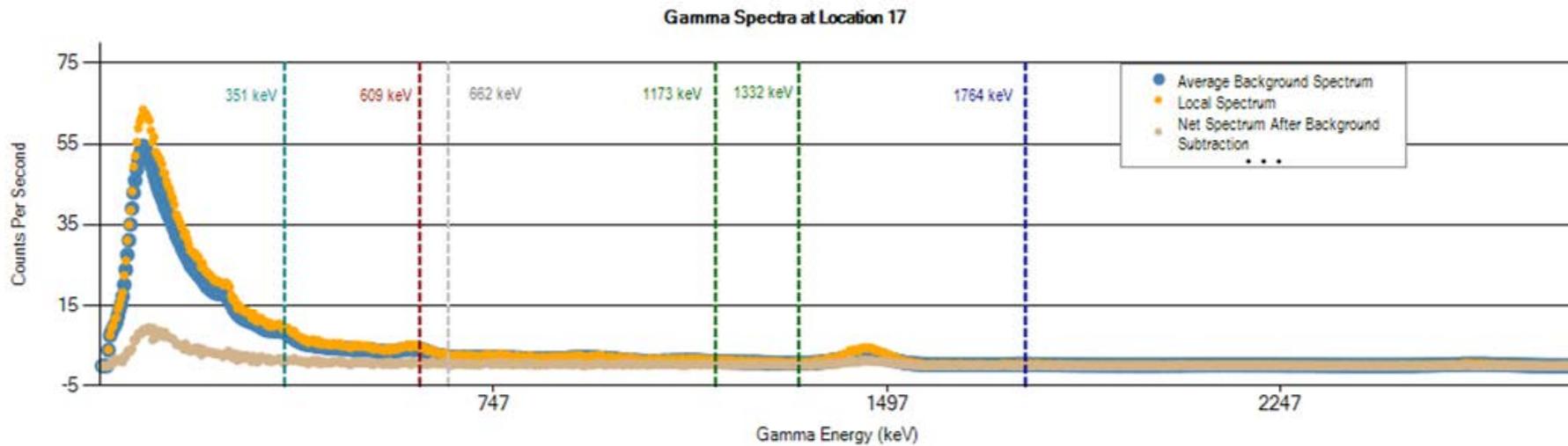
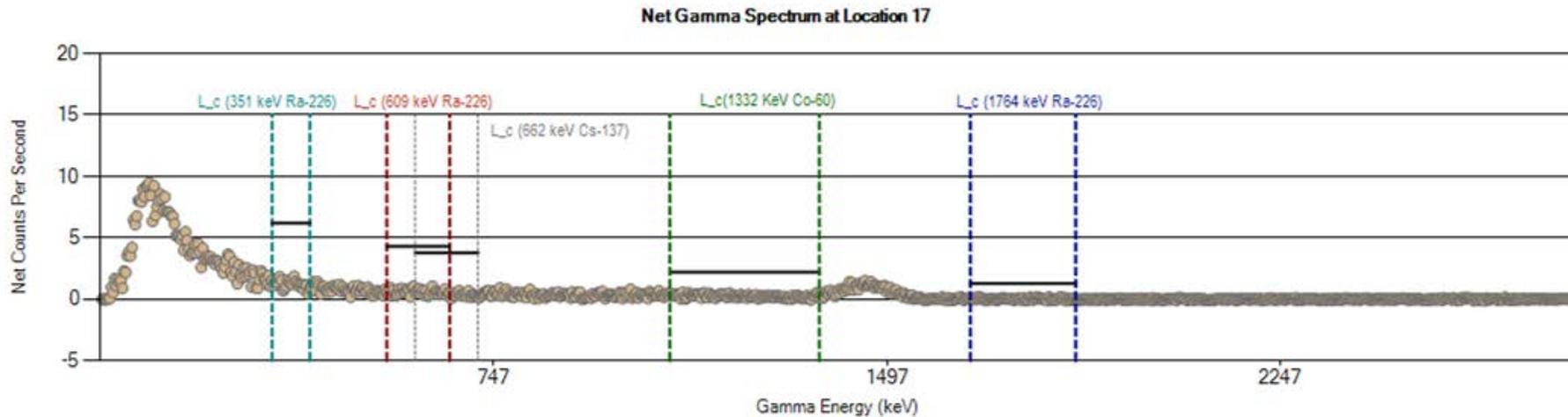
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 14 (cps)	961	143	21	23	166	154	119	194	103	4056
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 15 (cps)	<b>1130</b>	<b>179</b>	24	28	192	175	137	220	<b>122</b>	<b>4563</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

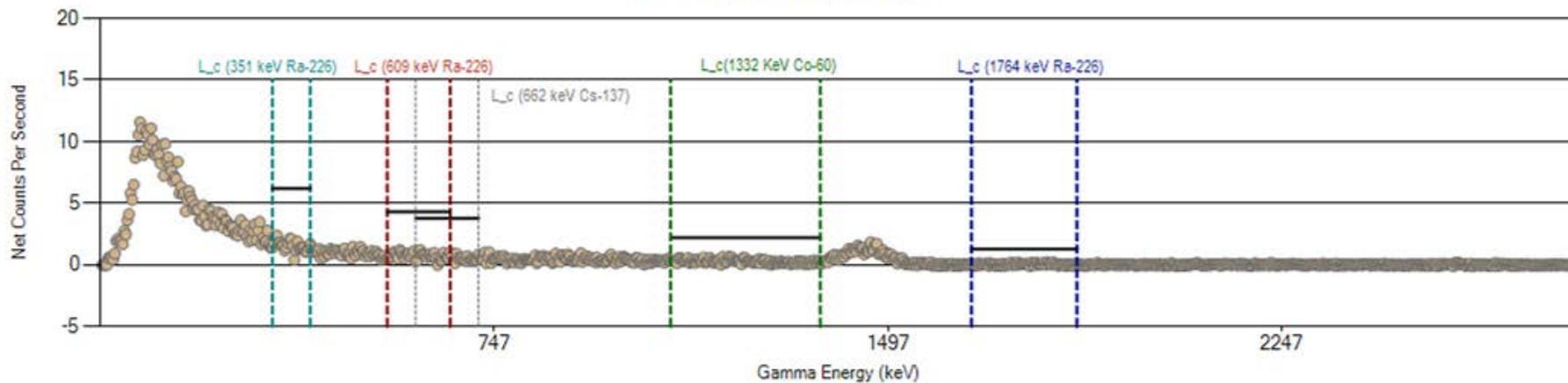


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 16 (cps)	<b>1091</b>	<b>168</b>	24	27	187	169	133	213	<b>121</b>	<b>4428</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

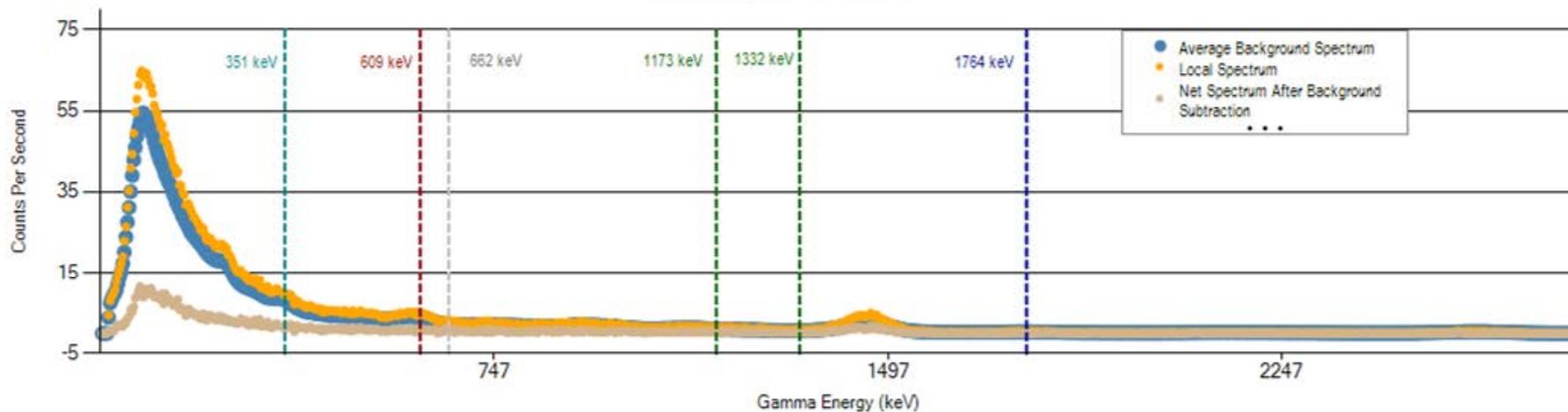


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 17 (cps)	1038	160	22	26	176	164	126	205	113	4248
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

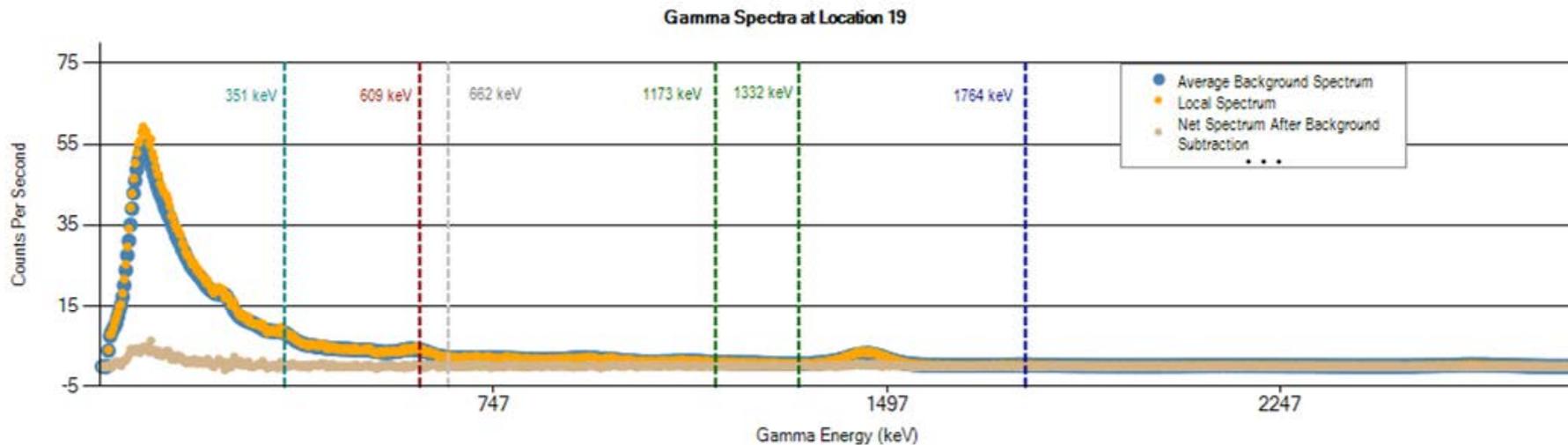
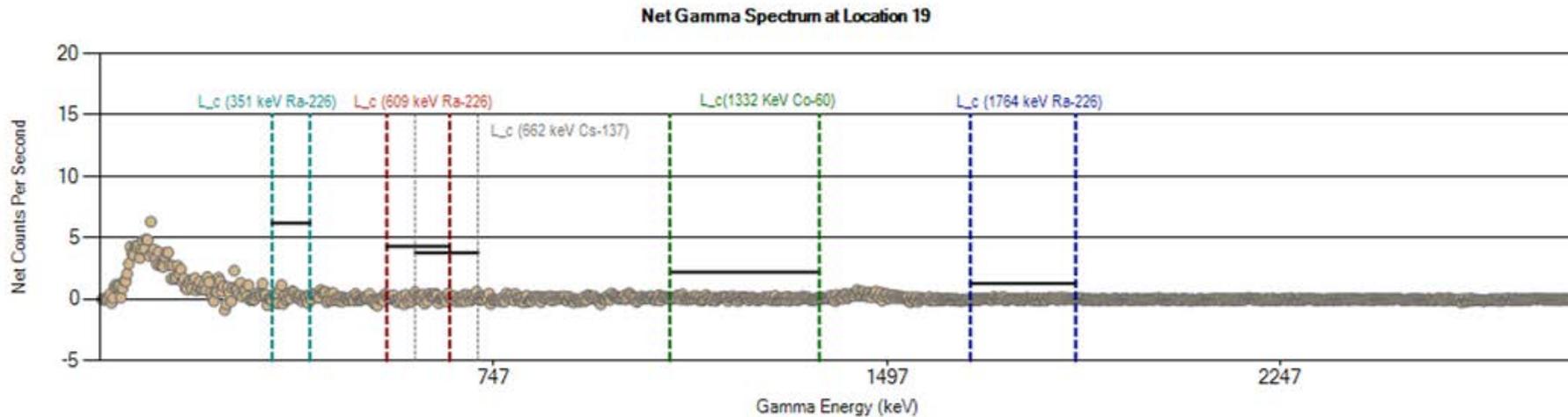
Net Gamma Spectrum at Location 18



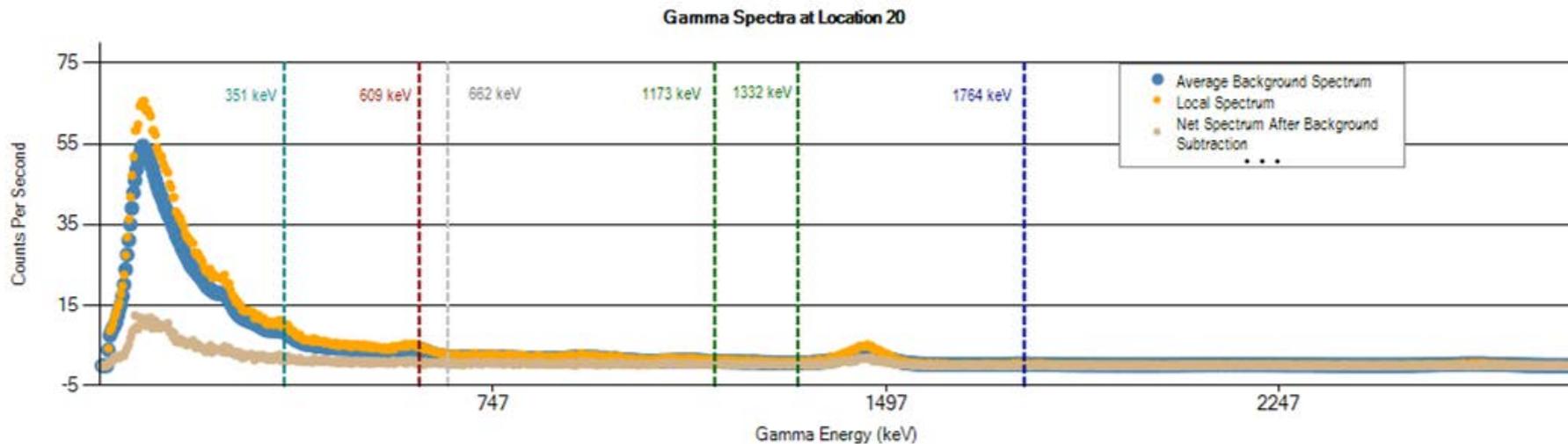
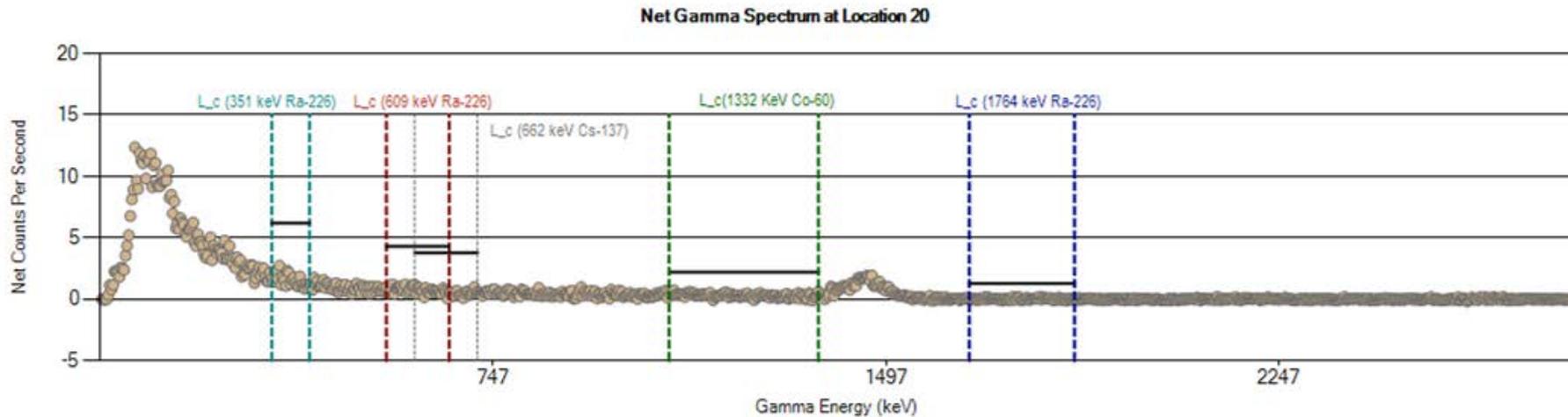
Gamma Spectra at Location 18



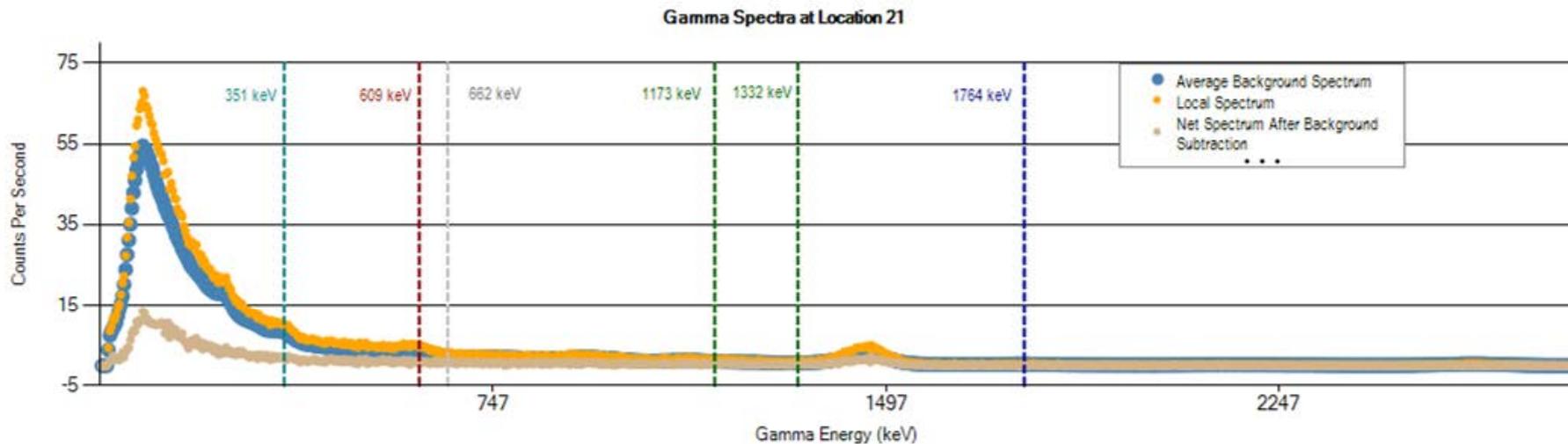
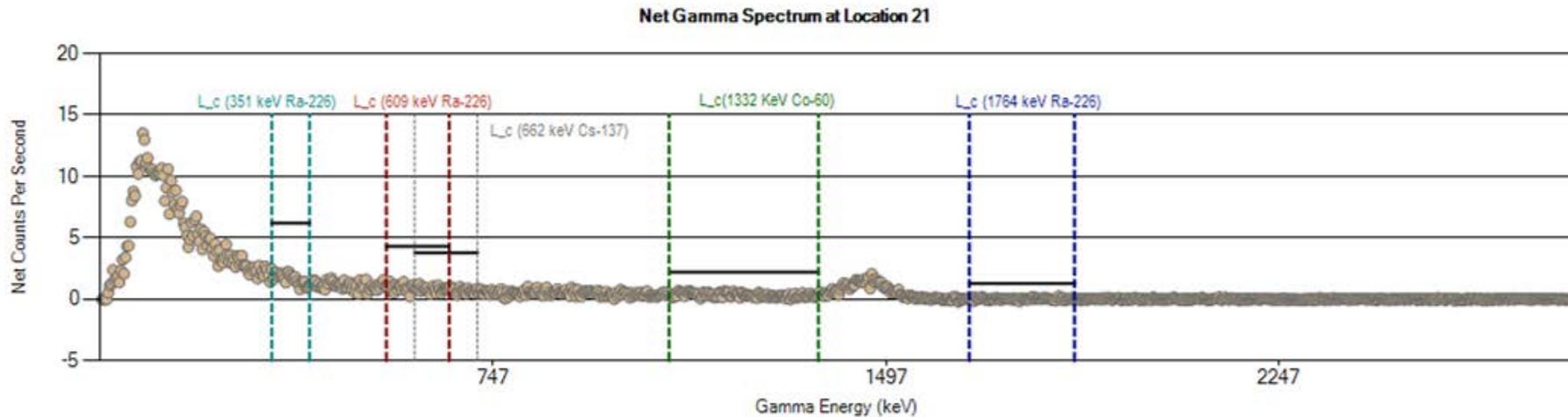
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 18 (cps)	<b>1074</b>	<b>162</b>	24	26	186	171	132	214	116	<b>4380</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



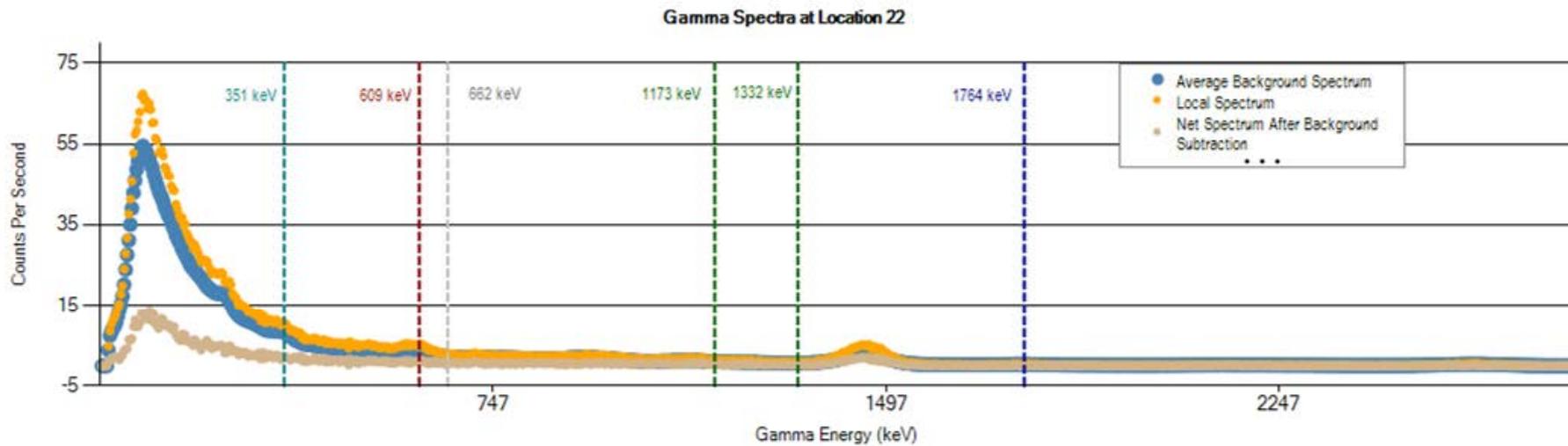
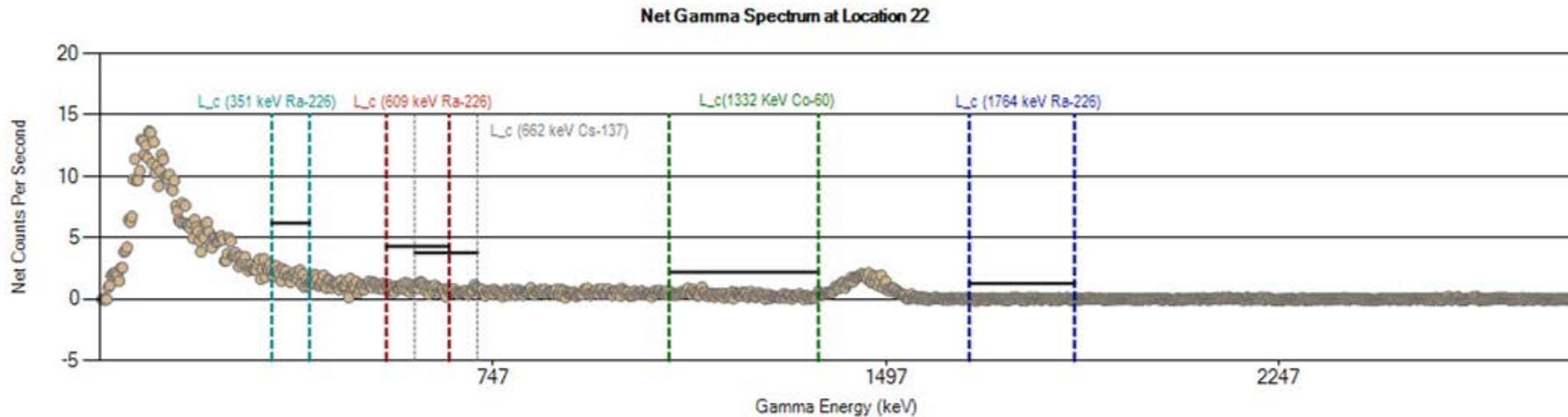
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 19 (cps)	890	129	22	21	152	144	112	179	95	3822
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



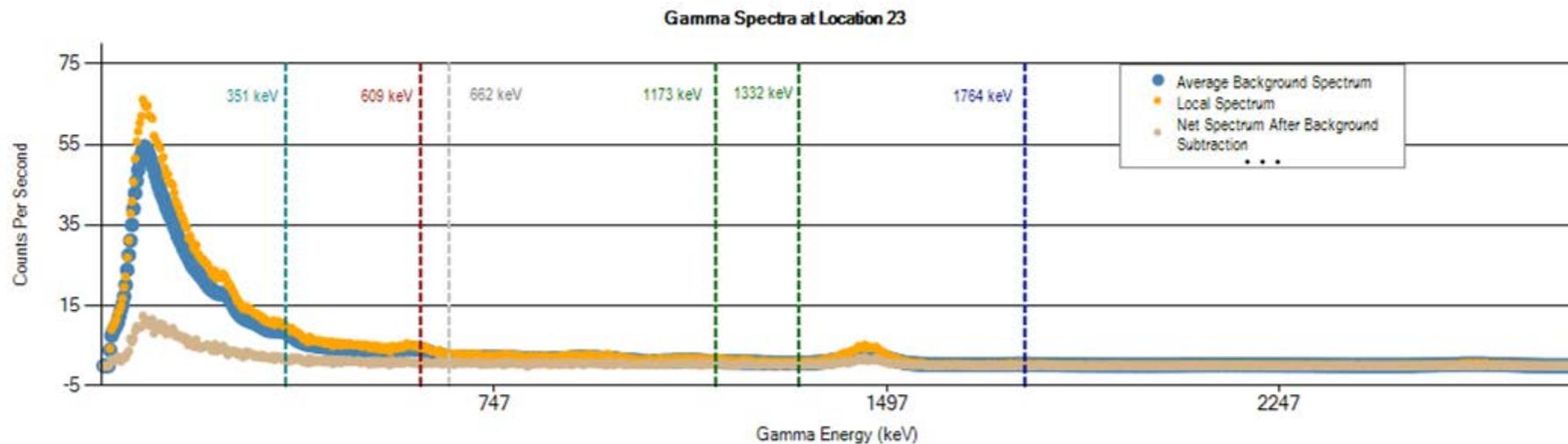
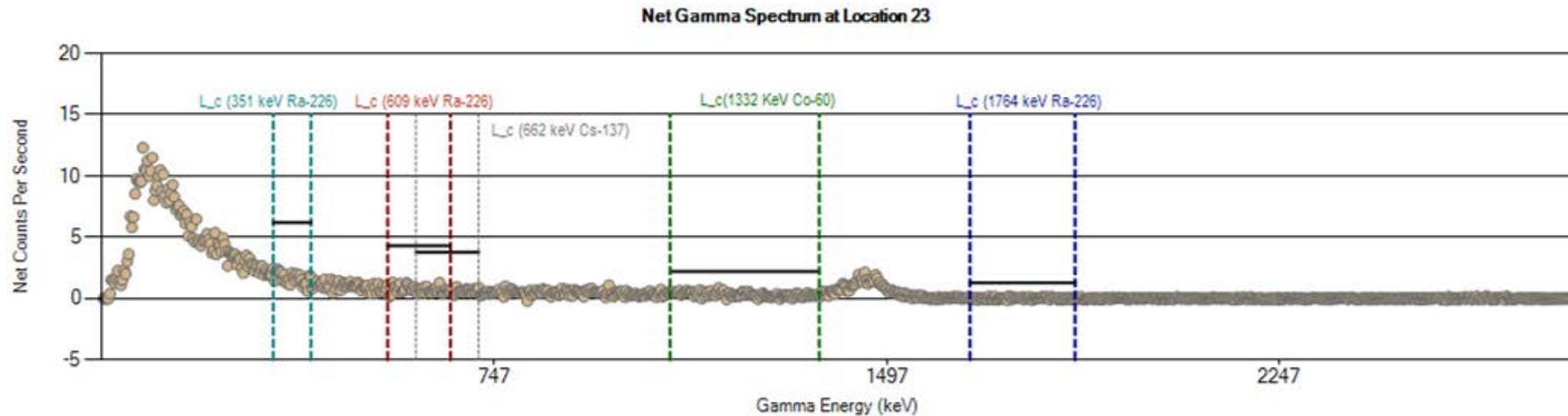
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 20 (cps)	<b>1077</b>	<b>168</b>	23	26	184	170	130	213	118	<b>4421</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



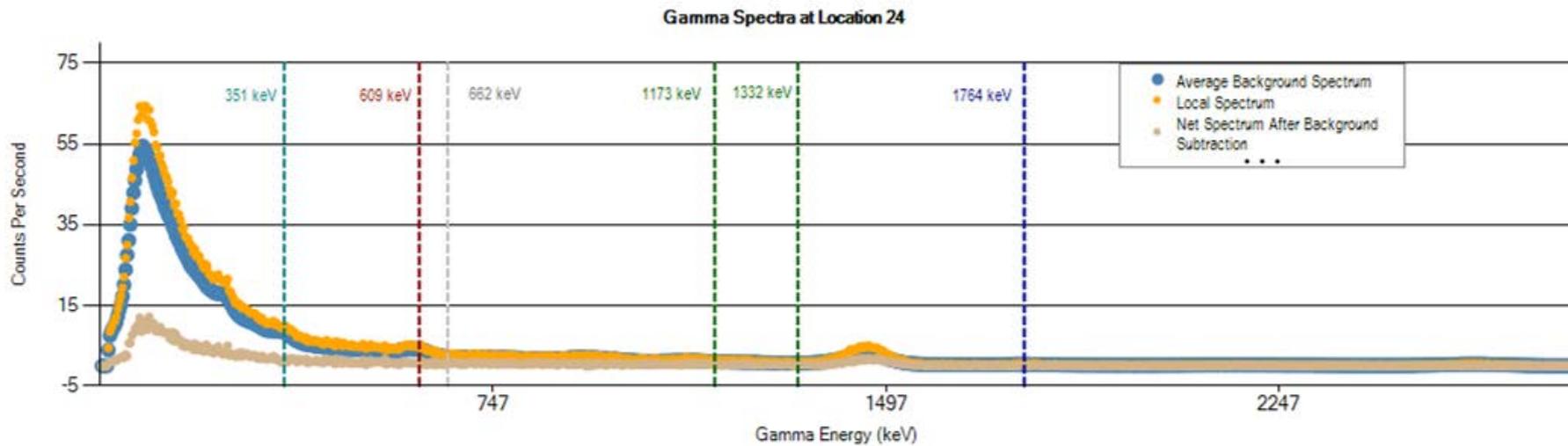
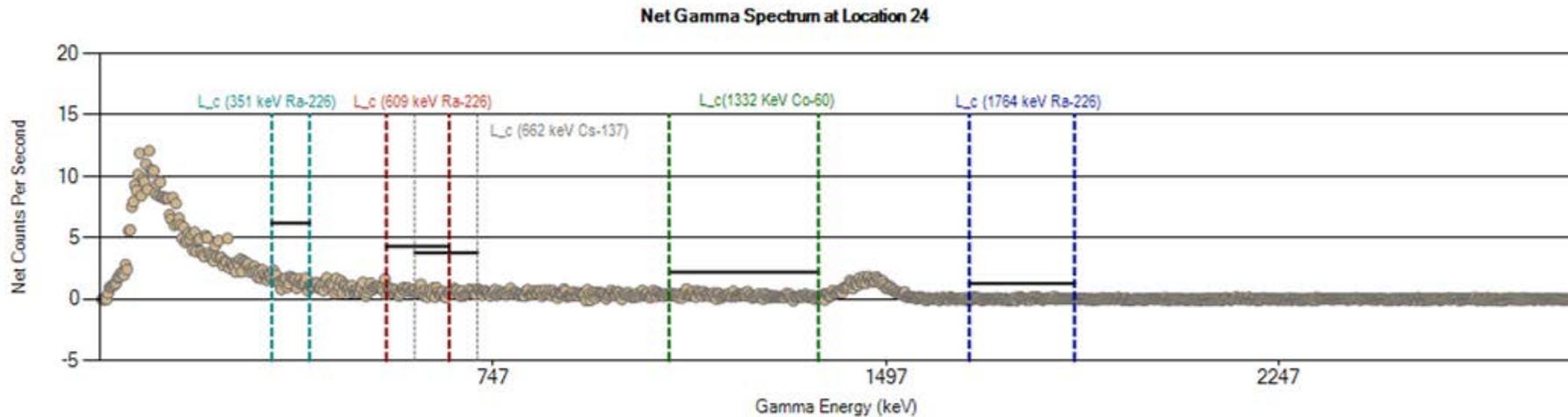
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 21 (cps)	<b>1108</b>	<b>170</b>	23	25	192	177	139	215	<b>122</b>	<b>4473</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



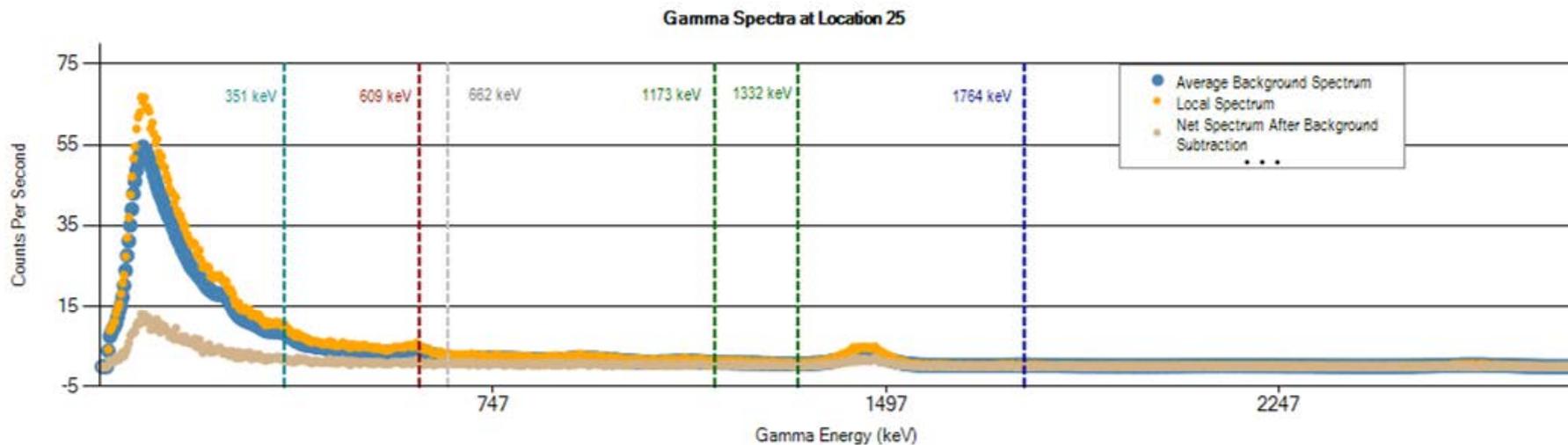
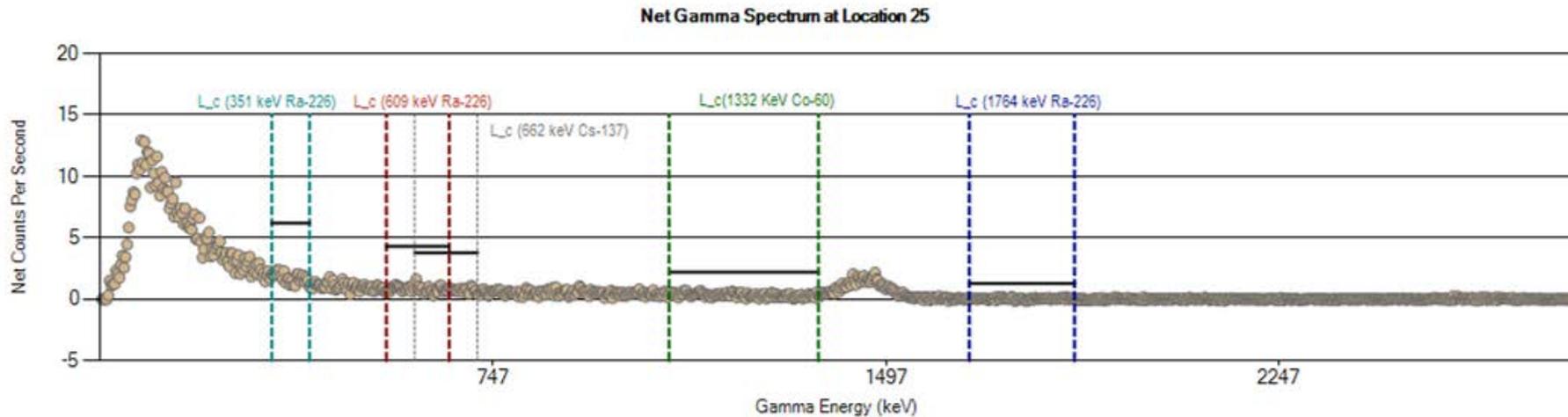
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 22 (cps)	<b>1131</b>	<b>179</b>	22	27	193	177	139	221	<b>123</b>	<b>4549</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



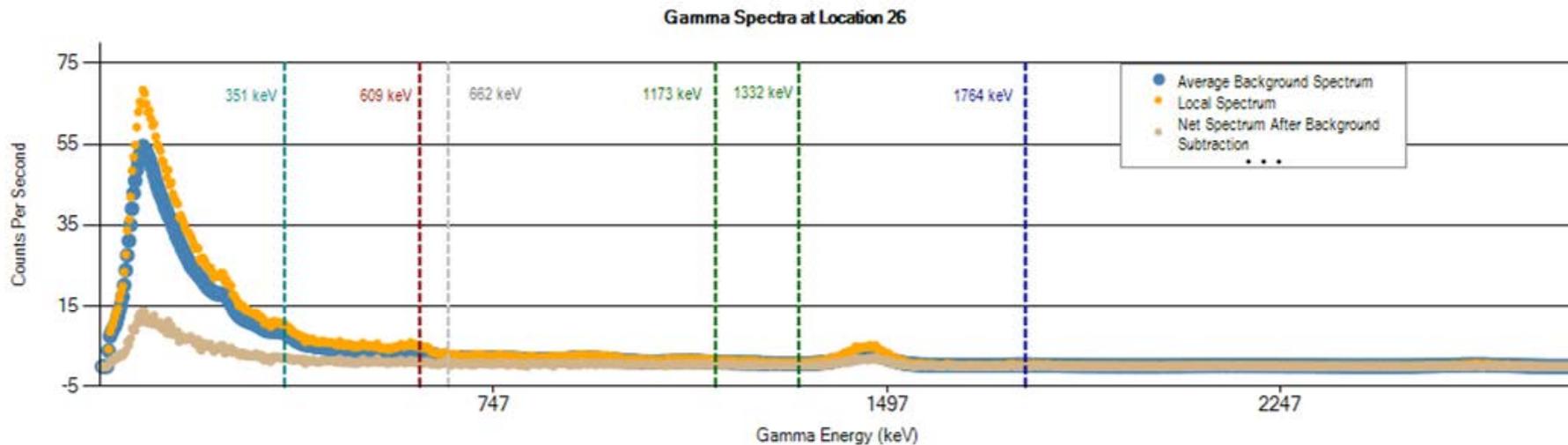
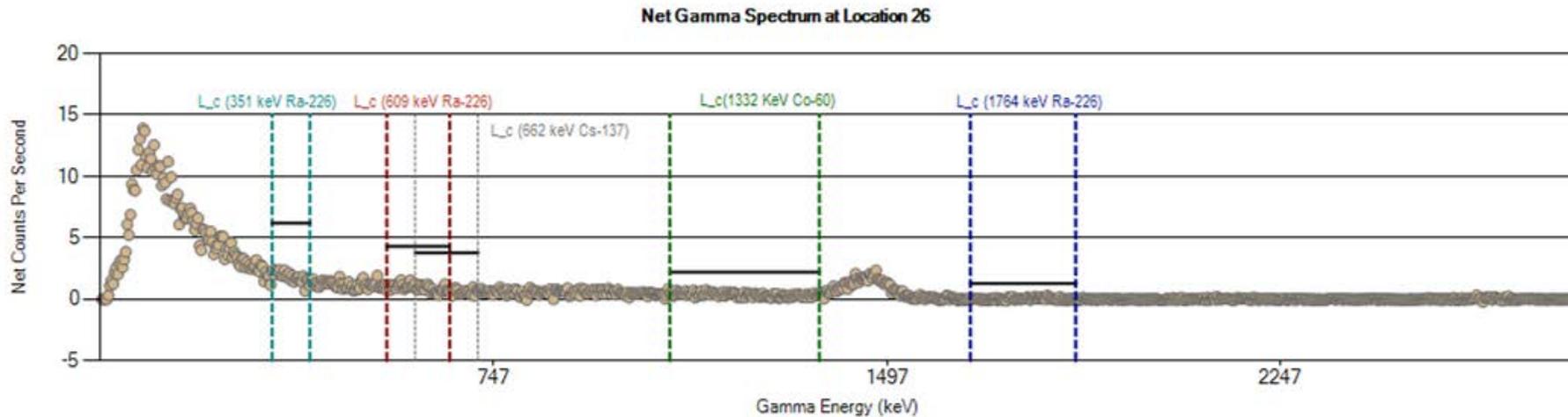
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 23 (cps)	<b>1086</b>	<b>167</b>	22	25	187	170	134	215	120	<b>4431</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 24 (cps)	<b>1078</b>	<b>169</b>	23	26	183	166	130	210	118	<b>4377</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

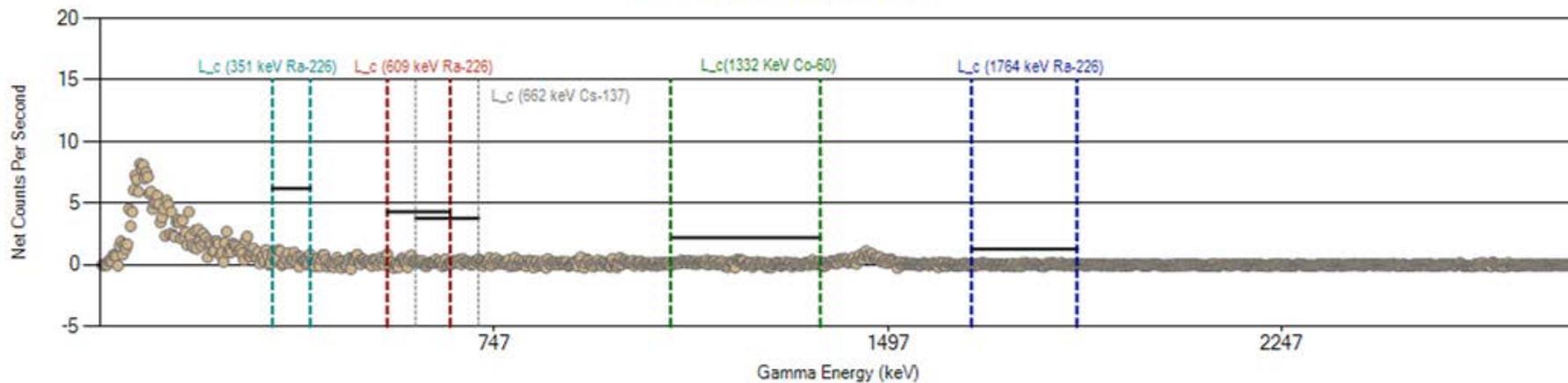


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 25 (cps)	<b>1113</b>	<b>174</b>	24	27	189	175	138	217	<b>121</b>	<b>4481</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

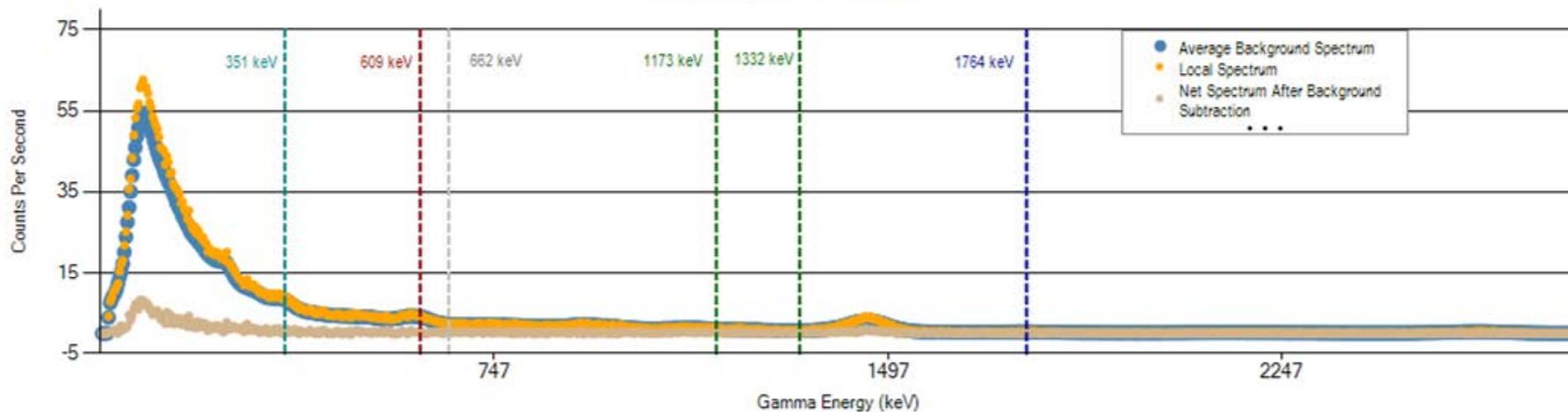


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 26 (cps)	<b>1131</b>	<b>179</b>	23	27	195	178	137	219	<b>124</b>	<b>4544</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

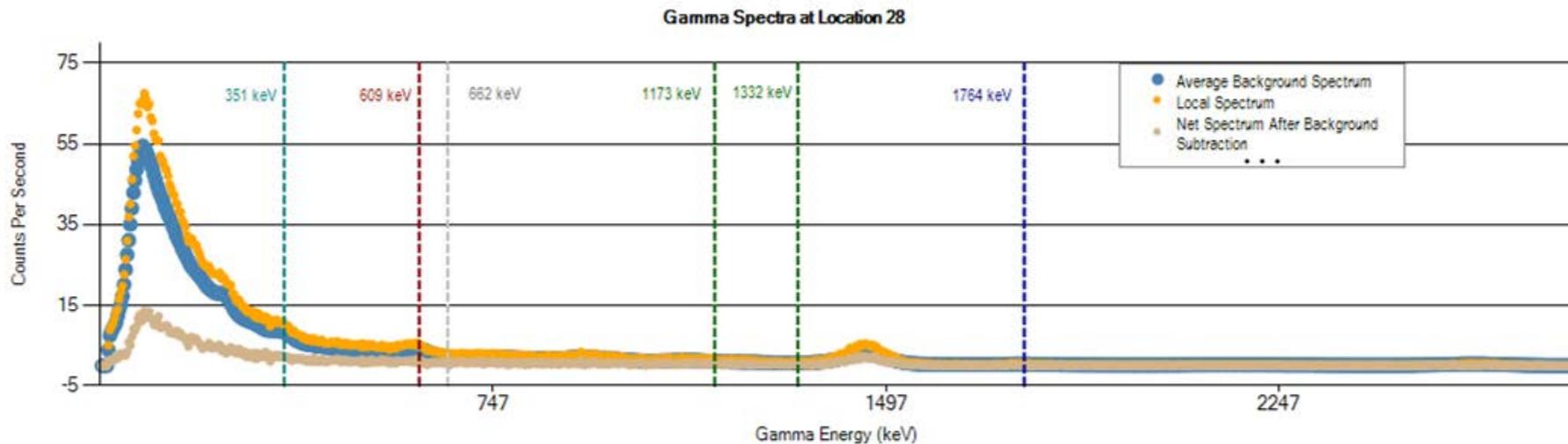
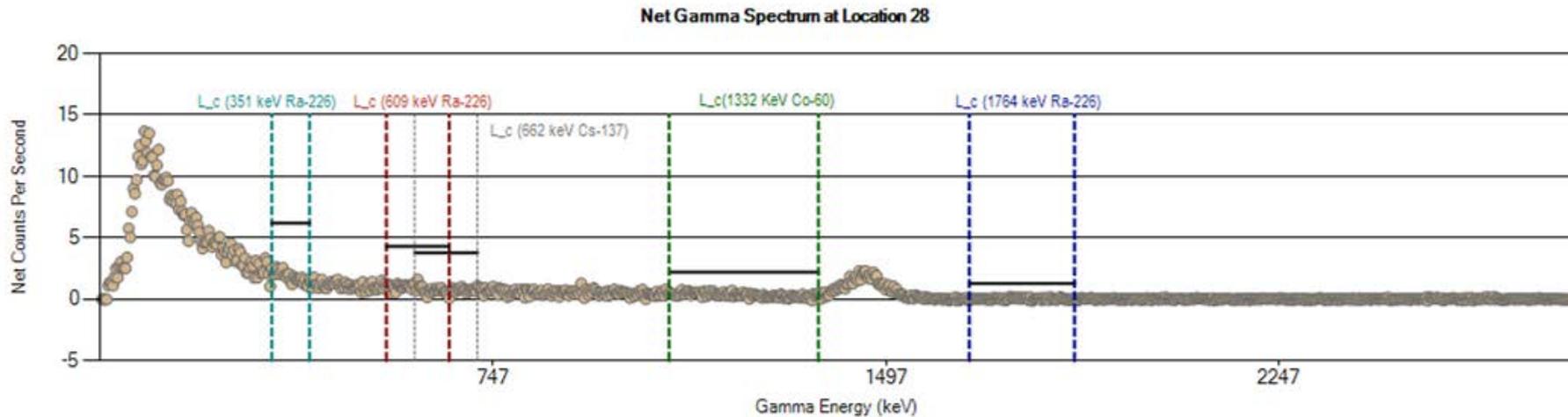
Net Gamma Spectrum at Location 27



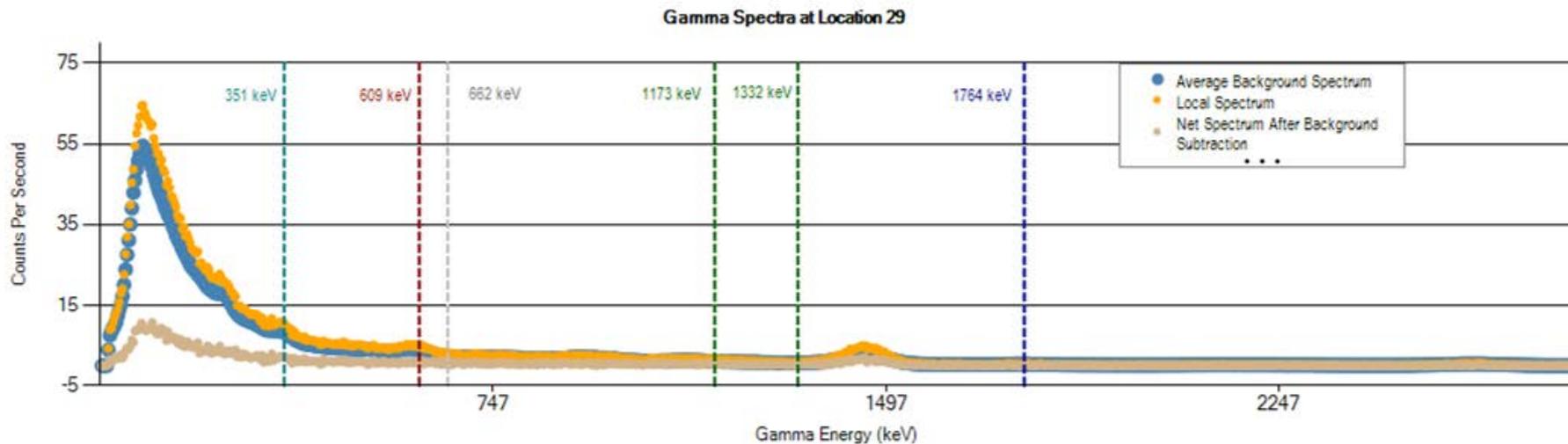
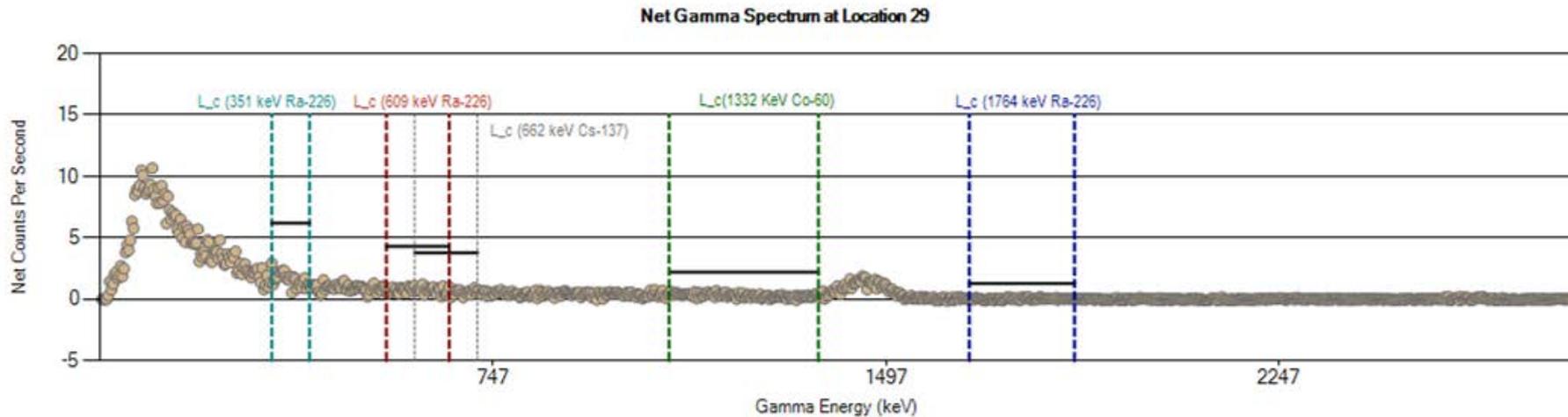
Gamma Spectra at Location 27



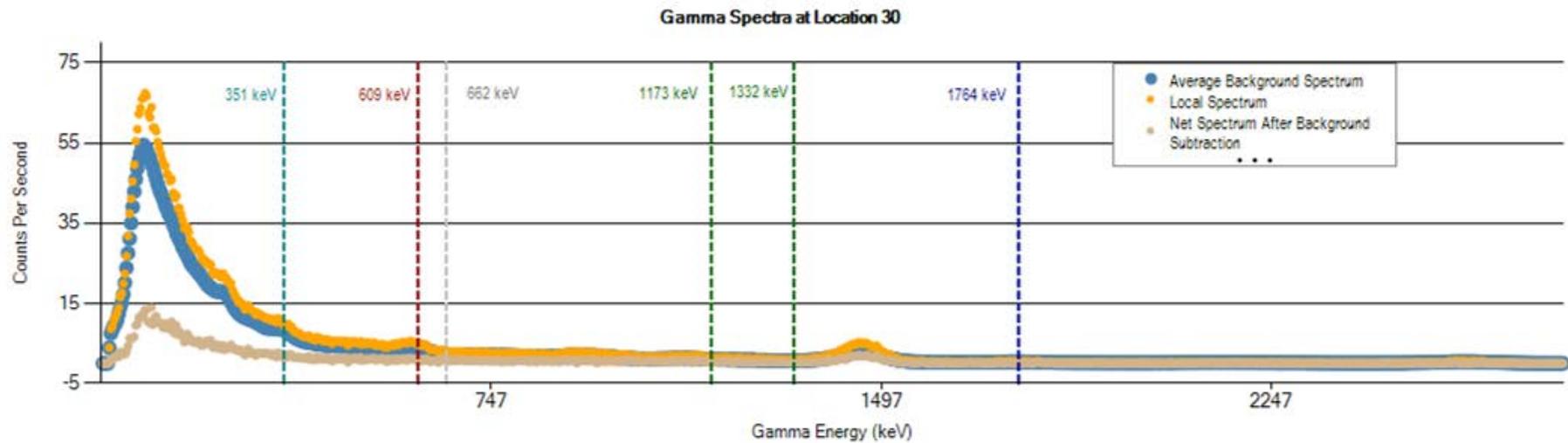
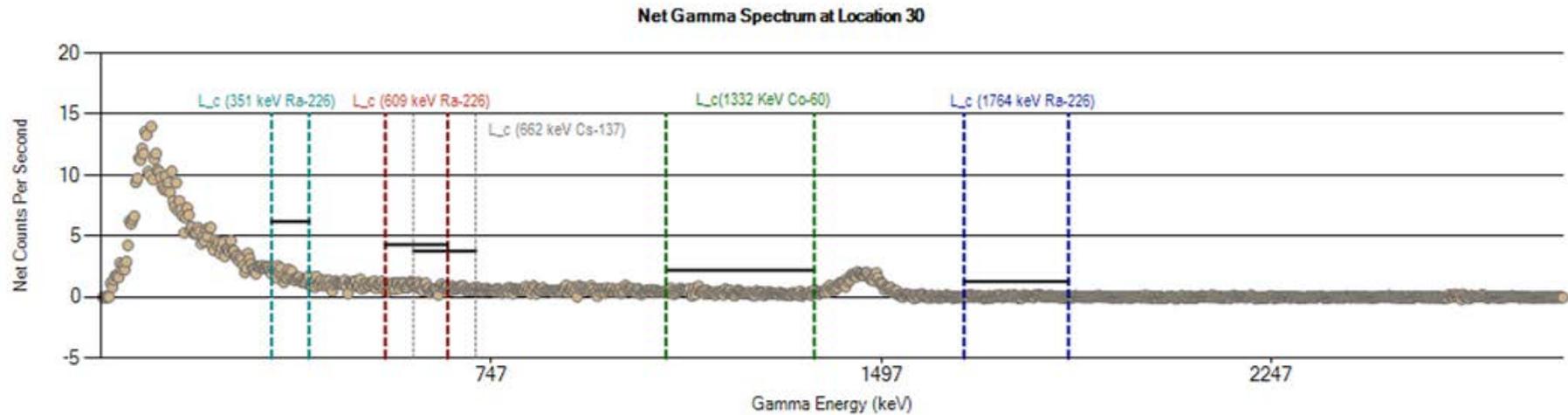
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 27 (cps)	931	134	22	24	161	148	116	187	101	3964
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



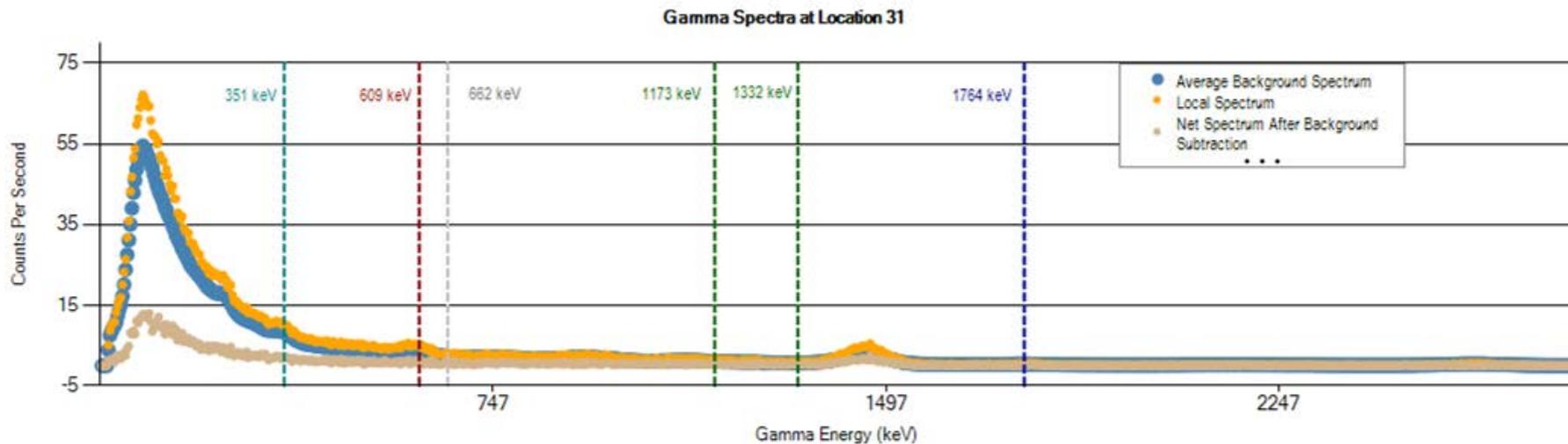
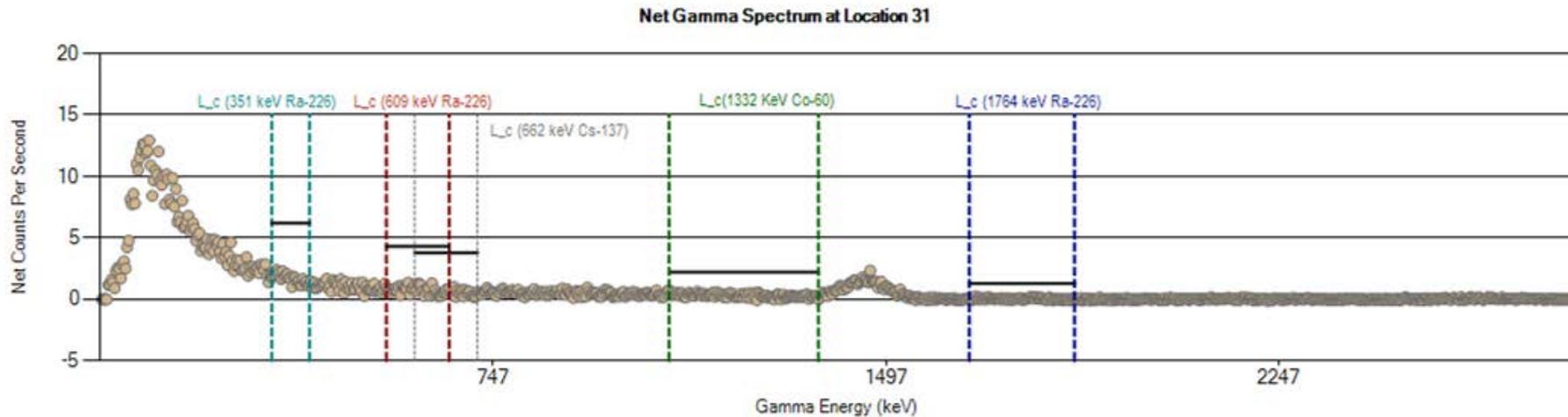
	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 28 (cps)	<b>1129</b>	<b>179</b>	23	28	192	176	138	219	<b>122</b>	<b>4527</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 29 (cps)	<b>1076</b>	<b>167</b>	23	26	184	170	134	213	118	<b>4356</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255



	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 30 (cps)	<b>1127</b>	<b>176</b>	25	26	191	175	138	217	<b>124</b>	<b>4510</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

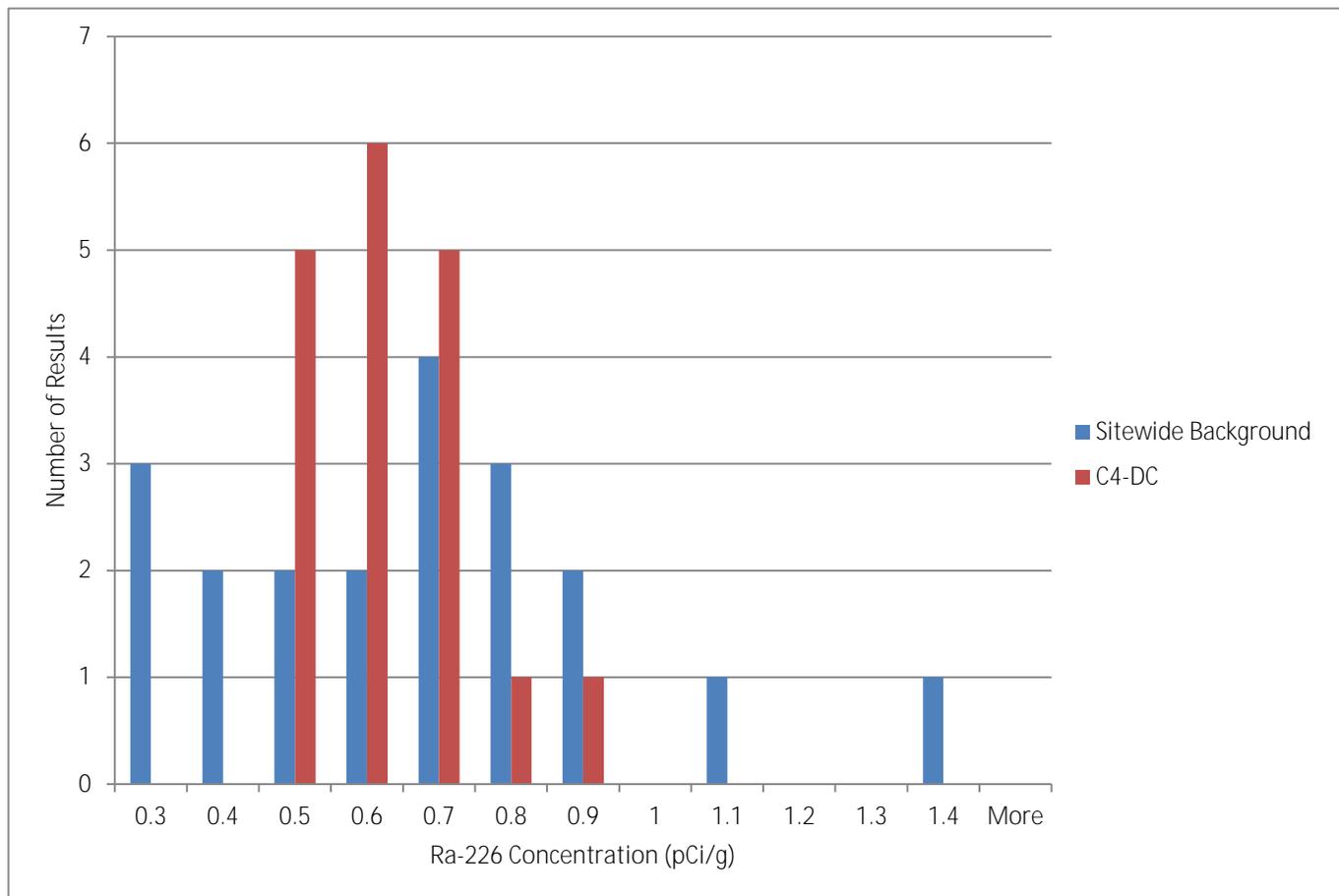


	ROI1	ROI2	ROI3	ROI4	ROI5	ROI6	ROI7	ROI8	ROI9	ROI10
Location 31 (cps)	<b>1094</b>	<b>170</b>	23	28	186	171	132	216	118	<b>4462</b>
Static IL (cps)	1052	150	35	41	201	189	146	229	120	4255

Histogram, RSY C4 (DC) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.3	3
0.4	2
0.5	2
0.6	2
0.7	4
0.8	3
0.9	2
1	0
1.1	1
1.2	0
1.3	0
1.4	1
More	0

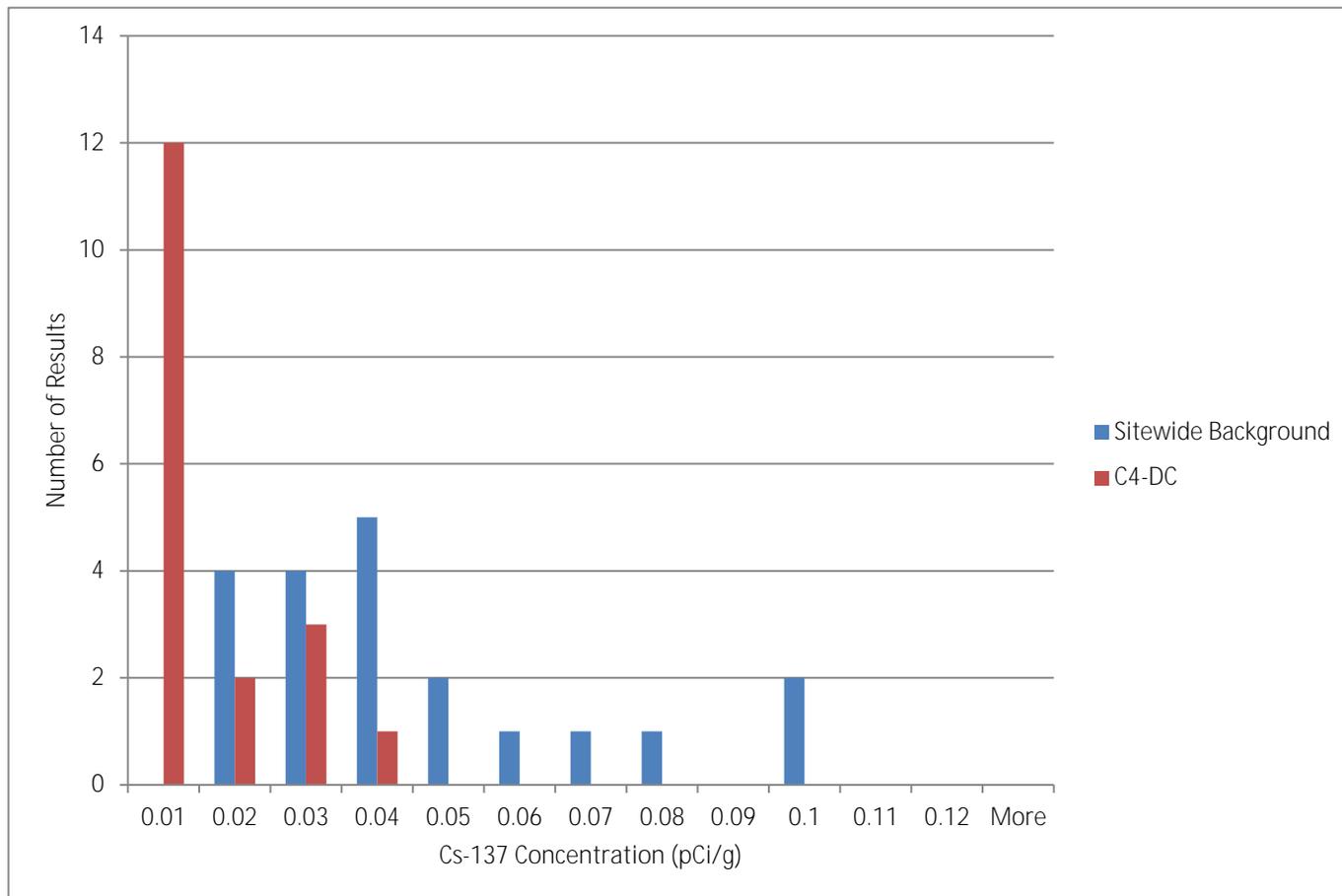
C4-DC	
<i>Bin</i>	<i>Frequency</i>
0.3	0
0.4	0
0.5	5
0.6	6
0.7	5
0.8	1
0.9	1
1	0
1.1	0
1.2	0
1.3	0
1.4	0
More	0



Histogram, RSY C4 (DC) vs. Sitewide Background

Background	
<i>Bin</i>	<i>Frequency</i>
0.01	0
0.02	4
0.03	4
0.04	5
0.05	2
0.06	1
0.07	1
0.08	1
0.09	0
0.1	2
0.11	0
0.12	0
More	0

C4-DC	
<i>Bin</i>	<i>Frequency</i>
0.01	12
0.02	2
0.03	3
0.04	1
0.05	0
0.06	0
0.07	0
0.08	0
0.09	0
0.1	0
0.11	0
0.12	0
More	0



# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis  
13715 Rider Trail North  
Earth City, MO 63045  
Tel: (314)298-8566

TestAmerica Job ID: 160-30067-2

Client Project/Site: Hunters Point Naval Shipyard - Parcel E2

For:

Aptim Federal Services LLC  
4005 Port Chicago Hwy, Suite 200  
Concord, California 94520

Attn: Eddie Kalombo

*Micha Korrinhizer*

Authorized for release by:

9/6/2018 2:59:48 PM

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Designee for

Rhonda Ridenhower, Manager of Project Management  
(314)298-8566

[rhonda.ridenhower@testamericainc.com](mailto:rhonda.ridenhower@testamericainc.com)

### LINKS

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*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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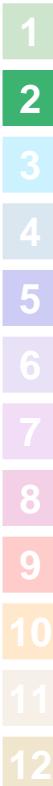
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## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

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**Job ID: 160-30067-2**

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**Laboratory: TestAmerica St. Louis****Narrative**

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### CASE NARRATIVE

**Client: Aptim Federal Services LLC****Project: Hunters Point Naval Shipyard - Parcel E2****Report Number: 160-30067-2**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica St. Louis attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results for Chemistry analyses are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header. All soil/sediment sample results for radiochemistry analyses are based upon sample as dried and disaggregated with the exception of tritium, carbon-14, and iodine-129 by gamma spectroscopy unless requested as wet weight by the client.

Any minimum detectable concentration (MDC), critical value (DLC), or Safe Drinking Water Act detection limit (SDWA DL) is sample-specific unless otherwise stated elsewhere in this narrative.

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

Manual Integrations were performed only when necessary and are in compliance with the laboratory's standard operating procedure. Detailed information can be found in the raw data section of the level IV report.

The following clean-up methods for Organic analyses may have been used on the samples in this data set. Specific methods employed are documented on the batch extraction logs:

Method 3600C: Cleanup  
Method 3620C: Florisil Cleanup  
Method 3630C: Silica Gel Cleanup  
Method 3640A: Gel-Permeation Cleanup  
Method 3650B: Acid-Base Partition Cleanup  
Method 3660B: Sulfur Cleanup

## Case Narrative

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

### Job ID: 160-30067-2 (Continued)

#### Laboratory: TestAmerica St. Louis (Continued)

Method 3665A: Sulfuric Acid/Permanganate Cleanup

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

#### RECEIPT

The samples were received on 08/09/2018; the samples arrived in good condition, properly preserved. The temperature of the coolers at receipt was 20.0° C.

#### TOTAL BETA STRONTIUM (GFPC)

Samples PE2-RSYC4-DC-S001 (160-30067-1) and PE2-RSYC4-DC-S011 (160-30067-11) were analyzed for Total Beta Strontium (GFPC) in accordance with EPA 905. The samples were dried on 08/09/2018, prepared on 08/16/2018 and analyzed on 09/05/2018.

The following samples in batch 160-382925 could not be thoroughly homogenized before sub-sampling was performed due to sample matrix: PE2-RSYC4-DC-S001 (160-30067-1) and PE2-RSYC4-DC-S011 (160-30067-11). The samples contained detritus material and rocks of varying sizes.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

#### RADIUM-226 BY GAMMA SPEC (21 DAY INGROWTH)

Samples PE2-RSYC4-DC-S001 (160-30067-1), PE2-RSYC4-DC-S002 (160-30067-2), PE2-RSYC4-DC-S003 (160-30067-3), PE2-RSYC4-DC-S004 (160-30067-4), PE2-RSYC4-DC-S005 (160-30067-5), PE2-RSYC4-DC-S006 (160-30067-6), PE2-RSYC4-DC-S007 (160-30067-7), PE2-RSYC4-DC-S008 (160-30067-8), PE2-RSYC4-DC-S009 (160-30067-9), PE2-RSYC4-DC-S010 (160-30067-10), PE2-RSYC4-DC-S011 (160-30067-11), PE2-RSYC4-DC-S012 (160-30067-12), PE2-RSYC4-DC-S013 (160-30067-13), PE2-RSYC4-DC-S014 (160-30067-14), PE2-RSYC4-DC-S015 (160-30067-15), PE2-RSYC4-DC-S016 (160-30067-16), PE2-RSYC4-DC-S017 (160-30067-17) and PE2-RSYC4-DC-S018 (160-30067-18) were analyzed for Radium-226 by gamma spec (21 day ingrowth) in accordance with EPA GA\_01\_R. The samples were dried on 08/09/2018, prepared on 08/10/2018 and analyzed on 08/31/2018.

The cesium-137 detection goal of 0.0700 pCi/g was not met for samples PE2-RSYC4-DC-S002 (160-30067-2), PE2-RSYC4-DC-S006 (160-30067-6) and PE2-RSYC4-DC-S009 (160-30067-9) in batch 160-381607. This is caused by statistical fluctuations in the Compton background due to low level activity in the samples in conjunction with the software attempting to fit a peak into the noise of this baseline.

The following sample in batch 160-381607 exhibited a negative result greater in magnitude than the 3 sigma TPU: PE2-RSYC4-DC-S015 (160-30067-15). This occurrence was evaluated and determined to be random in nature. Sporadic occurrences such as this are statistically expected. No further action is required.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

# CHAIN OF CUSTODY

Project Number: 500506  
CTO-013 RSYC4 Deconstruction Systematic  
Project Name: HPNS - Parcel E-2  
Project Location: HPNS - Parcel E-2  
Purchase Order #: 202296  
Shipment/Pickup Date: 8/8/18  
Waybill Number: 1266V545139751106  
Lab Destination: TestAmerica (St. Louis Lab)  
13715 Rider Trail North  
Earth City, MO 63045

Project Manager: Nels Johnson  
(Name & phone #)

Send Report To: Eddie Kalombo  
Phone/Fax Number: 415-987-0760  
Address: 4005 Port Chicago Hwy  
City: Concord, CA, 94520

Sample ID Number	Sampler's Name(s)	Sample Description	Collection Information		Matrix	Preservative (water)	Dose Rate µB/HR
			Date	Time			
PE2-RSYC4-DC-S001	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0845	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S002	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0850	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S003	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0854	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S004	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0858	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S005	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0902	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S006	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0907	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S007	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0912	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S008	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0916	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S009	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0921	SO	16 oz. plastic jar	5
PE2-RSYC4-DC-S010	JOHANN KAMPEEZ	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0926	SO	16 oz. plastic jar	5

**Special Instructions:**

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.  
7 days ingrown draft and follow with 21 days final.

Level Of QC Required:  24-hr  3-999  10-day

Standard TAT - 10-day

Relinquished By: JOHANN KAMPEEZ  
Date: 8/11/18  
Time: 1400

Relinquished By: MINSSEC L41  
Date: 8/8/18  
Time: 1400

Received By: MINSSEC L41  
Date: 8/11/18  
Time: 1400

Received By: MINSSEC L41  
Date: 8/9/18  
Time: 0930

Project Specific: III

Method Codes: C = Composite G = Grab  
Matrix Codes: DW = Drinking Water SO = Soil  
GW = Ground Water SL = Sludge  
WW = Waste Water CP = Chip Samples  
A = Air ABS = Asbestos, PO = Pipe Opening



160-30067 Chain of Custody





APTIM Federal Services, LLC  
4005 Port Chicago Hwy  
Concord, CA 94520

# CHAIN OF CUSTODY

Project Number: 500506

CTO-013 RSYC4 Deconstruction  
Systematic

Project Name: HPNS - Parcel E-2

Purchase Order #: 202296

Shipment/Pickup Date: 8/8/18

Waybill Number: 1266V5451397511061

Lab Destination:  
TestAmerica (St. Louis Lab)  
13715 Rider Trail North  
Earth City, MO 63045

Lab Contact Name / ph. #: Rhonda Ridenhower (314) 298-8566

Project Manager: Nels Johnson

(Name & phone #)

Send Report To: Eddie Kalombo

Phone/Fax Number: 415-987-0760

Address: 4005 Port Chicago Hwy

City: Concord, CA, 94520

Sampler's Name(s): JOAQUIN RAMIREZ

Sample ID Number	Sample Description	Collection Information			Matrix	# of containers	Preservative (water)		Dose Rate µR/Hr
		Date	Time	Method			Preservative (soil)	Container Type	
PE2-RSYC4-DC-S011	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0931	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S012	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0936	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S013	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0941	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S014	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0946	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S015	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0951	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S016	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	0956	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S017	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	1001	G	SO	1	16 oz. plastic jar	X	5
PE2-RSYC4-DC-S018	Parcel E-2 RSYC4 Deconstruction Systematic	8/11/18	1006	G	SO	1	16 oz. plastic jar	X	5

**Special Instructions:**

Analyze for Total Strontium as a screening step, and isotopic Sr-90 only if Total Strontium is above project action limit of 0.331 pCi/g.  
7 days ingrown draft and follow with 21 days final.

Level Of QC Required:  24-hr  3-day  10-day

Standard TAT - 10-day

Reinquired By: JOAQUIN RAMIREZ  
Date: 8/11/18 Time: 1400  
Received By: MINH SEC LAM  
Date: 8/18/18 Time: 1400

Reinquired By: MINH SEC LAM  
Date: 8/18/18 Time: 1400  
Received By: NICK BORDEN  
Date: 8/29/18 Time: 0830

Method Codes: C = Composite G = Grab  
Matrix Codes: DW = Drinking Water SO = Soil  
GW = Ground Water SL = Sludge  
WW = Waste Water CP = Chip Samples  
A = Air ABS = Asbestos, PO = Pipe Opening



## Login Sample Receipt Checklist

Client: Aptim Federal Services LLC

Job Number: 160-30067-2

**Login Number: 30067****List Source: TestAmerica St. Louis****List Number: 1****Creator: Press, Nicholas B**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	N/A	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Definitions/Glossary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

### Qualifiers

#### Rad

Qualifier	Qualifier Description
U	Undetected at the Limit of Detection.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

## Method Summary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Method	Method Description	Protocol	Laboratory
905.0	Total Beta Strontium (GFPC)	DOE	TAL SL
GA-01-R	Radium-226 & Other Gamma Emitters (GS)	DOE	TAL SL
DPS-0	Preparation, Digestion/ Precipitate	None	TAL SL
Dry and Grind	Preparation, Dry and Grind	None	TAL SL
Fill_Geo-21	Fill Geometry, 21-Day In-Growth	None	TAL SL

### Protocol References:

DOE = U.S. Department of Energy  
 None = None

### Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

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# Sample Summary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-30067-1	PE2-RSYC4-DC-S001	Solid	08/01/18 08:45	08/09/18 08:30
160-30067-2	PE2-RSYC4-DC-S002	Solid	08/01/18 08:50	08/09/18 08:30
160-30067-3	PE2-RSYC4-DC-S003	Solid	08/01/18 08:54	08/09/18 08:30
160-30067-4	PE2-RSYC4-DC-S004	Solid	08/01/18 08:58	08/09/18 08:30
160-30067-5	PE2-RSYC4-DC-S005	Solid	08/01/18 09:02	08/09/18 08:30
160-30067-6	PE2-RSYC4-DC-S006	Solid	08/01/18 09:07	08/09/18 08:30
160-30067-7	PE2-RSYC4-DC-S007	Solid	08/01/18 09:12	08/09/18 08:30
160-30067-8	PE2-RSYC4-DC-S008	Solid	08/01/18 09:16	08/09/18 08:30
160-30067-9	PE2-RSYC4-DC-S009	Solid	08/01/18 09:21	08/09/18 08:30
160-30067-10	PE2-RSYC4-DC-S010	Solid	08/01/18 09:26	08/09/18 08:30
160-30067-11	PE2-RSYC4-DC-S011	Solid	08/01/18 09:31	08/09/18 08:30
160-30067-12	PE2-RSYC4-DC-S012	Solid	08/01/18 09:36	08/09/18 08:30
160-30067-13	PE2-RSYC4-DC-S013	Solid	08/01/18 09:41	08/09/18 08:30
160-30067-14	PE2-RSYC4-DC-S014	Solid	08/01/18 09:46	08/09/18 08:30
160-30067-15	PE2-RSYC4-DC-S015	Solid	08/01/18 09:51	08/09/18 08:30
160-30067-16	PE2-RSYC4-DC-S016	Solid	08/01/18 09:56	08/09/18 08:30
160-30067-17	PE2-RSYC4-DC-S017	Solid	08/01/18 10:01	08/09/18 08:30
160-30067-18	PE2-RSYC4-DC-S018	Solid	08/01/18 10:06	08/09/18 08:30

## Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Client Sample ID: PE2-RSYC4-DC-S001

Lab Sample ID: 160-30067-1

Date Collected: 08/01/18 08:45

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count Uncert. (2 +/-)	Total Uncert. (2 +/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
Total Beta Strontium	0.0435	U	0.0729	0.0730	0.331	0.0565	pCi/g	08/16/18 12:28	09/05/18 05:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	80.7		40 - 110					08/16/18 12:28	09/05/18 05:45	1

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2 +/-)	Total Uncert. (2 +/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	<b>0.838</b>		0.161	0.182		0.0207	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Actinium-227	-0.219	U	0.617	0.617		0.577	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Bismuth-212	-0.356	U	0.768	0.769		0.610	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Bismuth-214	<b>0.682</b>		0.133	0.151		0.0468	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Cesium-137	-0.0441	U	0.0727	0.0729	0.0700	0.0575	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Cobalt-60	<b>0.0417</b>		0.0241	0.0244	0.200	0.00810	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Lead-210	0.605	U	1.30	1.31		1.05	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Lead-212	<b>0.867</b>		0.103	0.153		0.0437	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Lead-214	<b>0.810</b>		0.130	0.155		0.0456	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Potassium-40	<b>11.0</b>		1.27	1.70		0.218	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Protactinium-231	-0.805	U	2.78	2.78		2.27	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Radium-226	<b>0.682</b>		0.133	0.151	0.700	0.0468	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Radium-228	<b>0.838</b>		0.161	0.182		0.0207	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Thallium-208	<b>0.283</b>		0.0600	0.0668		0.0219	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Thorium-228	<b>0.867</b>		0.103	0.153		0.0437	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Thorium-232	<b>0.838</b>		0.161	0.182		0.0207	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Thorium-234	0.203	U	1.09	1.09		1.10	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Uranium-235	0.0998	U	0.208	0.209		0.411	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Uranium-238	0.203	U	1.09	1.09		1.10	pCi/g	08/10/18 13:35	08/31/18 07:46	1

Client Sample ID: PE2-RSYC4-DC-S002

Lab Sample ID: 160-30067-2

Date Collected: 08/01/18 08:50

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count Uncert. (2 +/-)	Total Uncert. (2 +/-)	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
Actinium 228	<b>0.619</b>		0.213	0.222		0.0585	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Actinium-227	-0.288	U	1.02	1.02		0.826	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Bismuth-212	0.000	U	0.749	0.749		0.789	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Bismuth-214	<b>0.758</b>		0.153	0.171		0.0303	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cesium-137	0.00133	U	0.0853	0.0853	0.0700	0.0701	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cobalt-60	0.0235	U	0.0648	0.0648	0.200	0.0301	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-210	<b>2.09</b>		1.94	1.95		1.17	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-212	<b>0.687</b>		0.112	0.133		0.0445	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-214	<b>0.627</b>		0.145	0.159		0.0579	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Potassium-40	<b>12.6</b>		1.66	2.09		0.128	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Protactinium-231	0.000	U	0.307	0.307		2.26	pCi/g	08/10/18 13:35	08/31/18 07:47	1

## Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Client Sample ID: PE2-RSYC4-DC-S002**

**Lab Sample ID: 160-30067-2**

Date Collected: 08/01/18 08:50

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Radium-226</b>	<b>0.758</b>		0.153	0.171	0.700	0.0303	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Radium-228</b>	<b>0.619</b>		0.213	0.222		0.0585	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thallium-208</b>	<b>0.159</b>		0.0664	0.0683		0.0281	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-228</b>	<b>0.687</b>		0.112	0.133		0.0445	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-232</b>	<b>0.619</b>		0.213	0.222		0.0585	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-234</b>	<b>1.12</b>		1.32	1.33		0.855	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Uranium-235	0.152	U	0.460	0.460		0.373	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Uranium-238</b>	<b>1.12</b>		1.32	1.33		0.855	pCi/g	08/10/18 13:35	08/31/18 07:47	1

**Client Sample ID: PE2-RSYC4-DC-S003**

**Lab Sample ID: 160-30067-3**

Date Collected: 08/01/18 08:54

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.825</b>		0.200	0.217		0.0485	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Actinium-227	0.0182	U	0.0421	0.0421		0.501	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Bismuth-212	0.482	U	0.913	0.914		0.717	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Bismuth-214</b>	<b>0.531</b>		0.125	0.136		0.0436	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Cesium-137	0.0246	U	0.0514	0.0515	0.0700	0.0397	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Cobalt-60	0.00348	U	0.0124	0.0124	0.200	0.0443	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Lead-210	-0.0307	U	1.52	1.52		1.07	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Lead-212</b>	<b>0.659</b>		0.110	0.139		0.0570	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Lead-214</b>	<b>0.575</b>		0.119	0.134		0.0665	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Potassium-40</b>	<b>15.3</b>		1.74	2.33		0.217	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Protactinium-231	0.000	U	0.472	0.472		1.96	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Radium-226</b>	<b>0.531</b>		0.125	0.136	0.700	0.0436	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Radium-228</b>	<b>0.825</b>		0.200	0.217		0.0485	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Thallium-208</b>	<b>0.213</b>		0.0617	0.0655		0.0243	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Thorium-228</b>	<b>0.659</b>		0.110	0.139		0.0570	pCi/g	08/10/18 13:35	08/31/18 07:46	1
<b>Thorium-232</b>	<b>0.825</b>		0.200	0.217		0.0485	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Thorium-234	-0.0675	U	1.18	1.18		0.973	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Uranium-235	-0.00826	U	0.336	0.336		0.316	pCi/g	08/10/18 13:35	08/31/18 07:46	1
Uranium-238	-0.0675	U	1.18	1.18		0.973	pCi/g	08/10/18 13:35	08/31/18 07:46	1

**Client Sample ID: PE2-RSYC4-DC-S004**

**Lab Sample ID: 160-30067-4**

Date Collected: 08/01/18 08:58

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.226</b>		0.295	0.296		0.195	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Actinium-227	0.359	U	0.891	0.892		0.717	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Bismuth-212	-0.0193	U	1.02	1.02		0.841	pCi/g	08/10/18 13:35	08/31/18 07:49	1

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Client Sample ID: PE2-RSYC4-DC-S004**

**Lab Sample ID: 160-30067-4**

**Date Collected: 08/01/18 08:58**

**Matrix: Solid**

**Date Received: 08/09/18 08:30**

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Bismuth-214</b>	<b>0.581</b>		0.154	0.165		0.0538	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Cesium-137	0.0114	U	0.0623	0.0623	0.0700	0.0499	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Cobalt-60	-0.0503	U	0.0812	0.0813	0.200	0.0532	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Lead-210</b>	<b>1.16</b>		1.20	1.21		0.898	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Lead-212</b>	<b>0.464</b>		0.121	0.135		0.0709	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Lead-214</b>	<b>0.523</b>		0.147	0.157		0.0564	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Potassium-40</b>	<b>11.6</b>		1.83	2.18		0.315	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Protactinium-231	0.424	U	1.69	1.70		2.66	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Radium-226</b>	<b>0.581</b>		0.154	0.165	0.700	0.0538	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Radium-228</b>	<b>0.226</b>		0.295	0.296		0.195	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Thallium-208</b>	<b>0.203</b>		0.0742	0.0771		0.0305	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Thorium-228</b>	<b>0.464</b>		0.121	0.135		0.0709	pCi/g	08/10/18 13:35	08/31/18 07:49	1
<b>Thorium-232</b>	<b>0.226</b>		0.295	0.296		0.195	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Thorium-234	0.110	U	1.81	1.81		1.49	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Uranium-235	-0.294	U	0.392	0.393		0.636	pCi/g	08/10/18 13:35	08/31/18 07:49	1
Uranium-238	0.110	U	1.81	1.81		1.49	pCi/g	08/10/18 13:35	08/31/18 07:49	1

**Client Sample ID: PE2-RSYC4-DC-S005**

**Lab Sample ID: 160-30067-5**

**Date Collected: 08/01/18 09:02**

**Matrix: Solid**

**Date Received: 08/09/18 08:30**

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.839</b>		0.242	0.257		0.0407	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Actinium-227	-0.476	U	1.26	1.26		1.02	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Bismuth-212	0.281	U	0.905	0.906		0.715	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Bismuth-214</b>	<b>0.620</b>		0.199	0.209		0.0796	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cesium-137	0.00469	U	0.0802	0.0802	0.0700	0.0656	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cobalt-60	-0.0555	U	0.107	0.107	0.200	0.0654	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Lead-210</b>	<b>2.33</b>		2.24	2.26		1.33	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Lead-212</b>	<b>0.612</b>		0.133	0.147		0.0702	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Lead-214</b>	<b>0.621</b>		0.152	0.165		0.0565	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Potassium-40</b>	<b>11.2</b>		1.83	2.16		0.451	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Protactinium-231	-1.14	U	4.09	4.10		3.34	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Radium-226</b>	<b>0.620</b>		0.199	0.209	0.700	0.0796	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Radium-228</b>	<b>0.839</b>		0.242	0.257		0.0407	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thallium-208</b>	<b>0.179</b>		0.132	0.133		0.0555	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-228</b>	<b>0.612</b>		0.133	0.147		0.0702	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-232</b>	<b>0.839</b>		0.242	0.257		0.0407	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Thorium-234</b>	<b>2.47</b>		1.03	1.06		0.660	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Uranium-235	0.136	U	0.291	0.292		0.569	pCi/g	08/10/18 13:35	08/31/18 07:47	1
<b>Uranium-238</b>	<b>2.47</b>		1.03	1.06		0.660	pCi/g	08/10/18 13:35	08/31/18 07:47	1

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

## Client Sample ID: PE2-RSYC4-DC-S006

Date Collected: 08/01/18 09:07

Date Received: 08/09/18 08:30

## Lab Sample ID: 160-30067-6

Matrix: Solid

### Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.833		0.186	0.205		0.0307	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Actinium-227	0.295	U	0.461	0.463		0.611	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Bismuth-212	0.00551	U	0.878	0.878		0.723	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Bismuth-214	0.574		0.158	0.169		0.0648	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cesium-137	-0.0599	U	0.0950	0.0952	0.0700	0.0743	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Cobalt-60	0.0174	U	0.0648	0.0648	0.200	0.0359	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-210	-1.07	U	1.48	1.49		1.83	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-212	0.685		0.109	0.140		0.0498	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Lead-214	0.622		0.120	0.137		0.0566	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Potassium-40	16.6		1.91	2.56		0.245	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Protactinium-231	0.000	U	0.549	0.549		2.47	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Radium-226	0.574		0.158	0.169	0.700	0.0648	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Radium-228	0.833		0.186	0.205		0.0307	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Thallium-208	0.144		0.118	0.119		0.0523	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Thorium-228	0.685		0.109	0.140		0.0498	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Thorium-232	0.833		0.186	0.205		0.0307	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Thorium-234	0.774		0.981	0.984		0.766	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Uranium-235	0.202	U	0.483	0.483		0.505	pCi/g	08/10/18 13:35	08/31/18 07:47	1
Uranium-238	0.774		0.981	0.984		0.766	pCi/g	08/10/18 13:35	08/31/18 07:47	1

## Client Sample ID: PE2-RSYC4-DC-S007

Date Collected: 08/01/18 09:12

Date Received: 08/09/18 08:30

## Lab Sample ID: 160-30067-7

Matrix: Solid

### Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.362		0.303	0.305		0.163	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Actinium-227	0.118	U	0.528	0.528		0.483	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Bismuth-212	0.655	U	1.40	1.41		1.11	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Bismuth-214	0.509		0.164	0.172		0.0591	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Cesium-137	0.0110	U	0.0762	0.0763	0.0700	0.0614	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Cobalt-60	0.0312	U	0.0568	0.0568	0.200	0.0567	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Lead-210	0.980		1.33	1.34		0.862	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Lead-212	0.571		0.117	0.138		0.0534	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Lead-214	0.647		0.131	0.147		0.0410	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Potassium-40	12.9		2.02	2.41		0.356	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Protactinium-231	0.000	U	0.424	0.424		2.60	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Radium-226	0.509		0.164	0.172	0.700	0.0591	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Radium-228	0.362		0.303	0.305		0.163	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Thallium-208	0.228		0.0855	0.0887		0.0325	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Thorium-228	0.571		0.117	0.138		0.0534	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Thorium-232	0.362		0.303	0.305		0.163	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Thorium-234	-0.374	U	1.66	1.66		1.38	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Uranium-235	0.0706	U	0.236	0.236		0.338	pCi/g	08/10/18 13:35	08/31/18 07:48	1
Uranium-238	-0.374	U	1.66	1.66		1.38	pCi/g	08/10/18 13:35	08/31/18 07:48	1

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Client Sample ID: PE2-RSYC4-DC-S008**

**Lab Sample ID: 160-30067-8**

**Date Collected: 08/01/18 09:16**

**Matrix: Solid**

**Date Received: 08/09/18 08:30**

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.505</b>		0.264	0.269		0.119	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Actinium-227	-0.0769	U	0.584	0.584		0.575	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Bismuth-212</b>	<b>0.952</b>		0.510	0.519		0.217	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Bismuth-214</b>	<b>0.515</b>		0.130	0.141		0.0514	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Cesium-137	0.0158	U	0.0456	0.0457	0.0700	0.0361	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Cobalt-60	0.0129	U	0.0216	0.0216	0.200	0.0352	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Lead-210	0.556	U	1.23	1.24		0.989	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Lead-212</b>	<b>0.795</b>		0.0993	0.143		0.0392	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Lead-214</b>	<b>0.621</b>		0.101	0.120		0.0403	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Potassium-40</b>	<b>15.3</b>		1.53	2.19		0.230	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Protactinium-231	-0.848	U	2.81	2.81		2.29	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Radium-226</b>	<b>0.515</b>		0.130	0.141	0.700	0.0514	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Radium-228</b>	<b>0.505</b>		0.264	0.269		0.119	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Thallium-208</b>	<b>0.268</b>		0.0661	0.0717		0.0241	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Thorium-228</b>	<b>0.795</b>		0.0993	0.143		0.0392	pCi/g	08/10/18 13:35	08/31/18 08:21	1
<b>Thorium-232</b>	<b>0.505</b>		0.264	0.269		0.119	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Thorium-234	-0.726	U	1.50	1.51		1.22	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Uranium-235	0.127	U	0.220	0.220		0.438	pCi/g	08/10/18 13:35	08/31/18 08:21	1
Uranium-238	-0.726	U	1.50	1.51		1.22	pCi/g	08/10/18 13:35	08/31/18 08:21	1

**Client Sample ID: PE2-RSYC4-DC-S009**

**Lab Sample ID: 160-30067-9**

**Date Collected: 08/01/18 09:21**

**Matrix: Solid**

**Date Received: 08/09/18 08:30**

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.853</b>		0.225	0.241		0.0659	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Actinium-227	-0.420	U	1.08	1.08		0.877	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Bismuth-212	0.324	U	0.819	0.819		0.645	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Bismuth-214</b>	<b>0.637</b>		0.142	0.156		0.0367	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Cesium-137	-0.0494	U	0.0972	0.0973	0.0700	0.0770	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Cobalt-60	-0.0667	U	0.145	0.145	0.200	0.0697	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Lead-210</b>	<b>1.28</b>		1.75	1.75		1.12	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Lead-212</b>	<b>0.613</b>		0.114	0.130		0.0569	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Lead-214</b>	<b>0.571</b>		0.125	0.138		0.0690	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Potassium-40</b>	<b>14.1</b>		1.71	2.23		0.120	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Protactinium-231	0.000	U	0.801	0.801		2.48	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Radium-226</b>	<b>0.637</b>		0.142	0.156	0.700	0.0367	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Radium-228</b>	<b>0.853</b>		0.225	0.241		0.0659	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Thallium-208</b>	<b>0.179</b>		0.0767	0.0788		0.0343	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Thorium-228</b>	<b>0.613</b>		0.114	0.130		0.0569	pCi/g	08/10/18 13:35	08/31/18 08:22	1
<b>Thorium-232</b>	<b>0.853</b>		0.225	0.241		0.0659	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Thorium-234	0.409	U	0.648	0.650		0.821	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Uranium-235	0.113	U	0.258	0.258		0.481	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Uranium-238	0.409	U	0.648	0.650		0.821	pCi/g	08/10/18 13:35	08/31/18 08:22	1

## Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Client Sample ID: PE2-RSYC4-DC-S010

Lab Sample ID: 160-30067-10

Date Collected: 08/01/18 09:26

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.974		0.199	0.222		0.0618	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Actinium-227	0.101	U	0.221	0.222		0.462	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Bismuth-212	-0.531	U	0.733	0.736		0.796	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Bismuth-214	0.545		0.162	0.171		0.0698	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Cesium-137	-0.0431	U	0.0936	0.0937	0.0700	0.0631	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Cobalt-60	0.0552		0.0295	0.0300	0.200	0.0109	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Lead-210	0.591	U	1.12	1.12		0.769	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Lead-212	0.695		0.107	0.139		0.0500	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Lead-214	0.711		0.139	0.157		0.0696	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Potassium-40	17.4		1.84	2.56		0.214	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Protactinium-231	0.000	U	0.673	0.673		2.16	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Radium-226	0.545		0.162	0.171	0.700	0.0698	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Radium-228	0.974		0.199	0.222		0.0618	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Thallium-208	0.275		0.0724	0.0778		0.0266	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Thorium-228	0.695		0.107	0.139		0.0500	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Thorium-232	0.974		0.199	0.222		0.0618	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Thorium-234	0.229	U	1.25	1.25		1.02	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Uranium-235	-0.0621	U	0.225	0.225		0.282	pCi/g	08/10/18 13:35	08/31/18 08:31	1
Uranium-238	0.229	U	1.25	1.25		1.02	pCi/g	08/10/18 13:35	08/31/18 08:31	1

Client Sample ID: PE2-RSYC4-DC-S011

Lab Sample ID: 160-30067-11

Date Collected: 08/01/18 09:31

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: 905.0 - Total Beta Strontium (GFPC)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Total Beta Strontium	-0.0143	U	0.0681	0.0681	0.331	0.0573	pCi/g	08/16/18 12:28	09/05/18 05:45	1
Carrier	%Yield	Qualifier	Limits					Prepared	Analyzed	Dil Fac
Sr Carrier	72.9		40 - 110					08/16/18 12:28	09/05/18 05:45	1

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.787		0.220	0.235		0.0359	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Actinium-227	0.000376	U	0.00113	0.00113		0.750	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Bismuth-212	-0.336	U	0.773	0.774		0.852	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Bismuth-214	0.638		0.159	0.172		0.0501	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Cesium-137	0.0314	U	0.0626	0.0627	0.0700	0.0481	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Cobalt-60	-0.0444	U	0.0693	0.0694	0.200	0.0683	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Lead-210	1.16		1.52	1.52		0.960	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Lead-212	0.638		0.122	0.147		0.0625	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Lead-214	0.650		0.165	0.178		0.0670	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Potassium-40	14.6		1.96	2.46		0.291	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Protactinium-231	-1.04	U	3.35	3.35		2.73	pCi/g	08/10/18 13:35	08/31/18 08:33	1

# Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Client Sample ID: PE2-RSYC4-DC-S011**

**Lab Sample ID: 160-30067-11**

Date Collected: 08/01/18 09:31

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Radium-226	0.638		0.159	0.172	0.700	0.0501	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Radium-228	0.787		0.220	0.235		0.0359	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Thallium-208	0.210		0.0872	0.0898		0.0365	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Thorium-228	0.638		0.122	0.147		0.0625	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Thorium-232	0.787		0.220	0.235		0.0359	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Thorium-234	1.52		1.16	1.17		0.756	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Uranium-235	0.0190	U	0.177	0.177		0.459	pCi/g	08/10/18 13:35	08/31/18 08:33	1
Uranium-238	1.52		1.16	1.17		0.756	pCi/g	08/10/18 13:35	08/31/18 08:33	1

**Client Sample ID: PE2-RSYC4-DC-S012**

**Lab Sample ID: 160-30067-12**

Date Collected: 08/01/18 09:36

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	1.08		0.321	0.339		0.0858	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Actinium-227	0.395	U	1.01	1.01		0.820	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Bismuth-212	-0.387	U	0.924	0.925		0.910	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Bismuth-214	0.642		0.176	0.188		0.0664	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Cesium-137	0.0290	U	0.0734	0.0735	0.0700	0.0578	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Cobalt-60	0.0124	U	0.0676	0.0676	0.200	0.0328	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Lead-210	1.08	U	2.10	2.11		1.32	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Lead-212	0.752		0.121	0.144		0.0506	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Lead-214	0.724		0.150	0.167		0.0804	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Potassium-40	16.2		2.01	2.59		0.387	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Protactinium-231	-1.17	U	3.87	3.87		3.16	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Radium-226	0.642		0.176	0.188	0.700	0.0664	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Radium-228	1.08		0.321	0.339		0.0858	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Thallium-208	0.311		0.107	0.111		0.0422	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Thorium-228	0.752		0.121	0.144		0.0506	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Thorium-232	1.08		0.321	0.339		0.0858	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Thorium-234	0.292	U	0.517	0.519		1.43	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Uranium-235	-0.0510	U	0.0892	0.0894		0.639	pCi/g	08/10/18 13:35	08/31/18 08:22	1
Uranium-238	0.292	U	0.517	0.519		1.43	pCi/g	08/10/18 13:35	08/31/18 08:22	1

**Client Sample ID: PE2-RSYC4-DC-S013**

**Lab Sample ID: 160-30067-13**

Date Collected: 08/01/18 09:41

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	1.01		0.229	0.251		0.0598	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Actinium-227	0.341	U	0.850	0.851		0.688	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Bismuth-212	0.561	U	1.10	1.10		0.867	pCi/g	08/10/18 13:35	08/31/18 08:23	1

## Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Client Sample ID: PE2-RSYC4-DC-S013

Lab Sample ID: 160-30067-13

Date Collected: 08/01/18 09:41

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS) (Continued)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Bismuth-214</b>	<b>0.666</b>		0.132	0.149		0.0356	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Cesium-137	0.00565	U	0.0516	0.0516	0.0700	0.0415	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Cobalt-60	0.00974	U	0.0472	0.0472	0.200	0.0350	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Lead-210	0.296	U	1.97	1.97		1.61	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Lead-212</b>	<b>0.840</b>		0.107	0.153		0.0343	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Lead-214</b>	<b>0.679</b>		0.111	0.131		0.0447	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Potassium-40</b>	<b>16.6</b>		1.89	2.54		0.238	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Protactinium-231	-0.610	U	3.11	3.11		2.54	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Radium-226</b>	<b>0.666</b>		0.132	0.149	0.700	0.0356	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Radium-228</b>	<b>1.01</b>		0.229	0.251		0.0598	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Thallium-208</b>	<b>0.319</b>		0.0747	0.0817		0.0243	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Thorium-228</b>	<b>0.840</b>		0.107	0.153		0.0343	pCi/g	08/10/18 13:35	08/31/18 08:23	1
<b>Thorium-232</b>	<b>1.01</b>		0.229	0.251		0.0598	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Thorium-234	-1.24	U	1.74	1.75		1.45	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Uranium-235	0.0684	U	0.170	0.170		0.466	pCi/g	08/10/18 13:35	08/31/18 08:23	1
Uranium-238	-1.24	U	1.74	1.75		1.45	pCi/g	08/10/18 13:35	08/31/18 08:23	1

Client Sample ID: PE2-RSYC4-DC-S014

Lab Sample ID: 160-30067-14

Date Collected: 08/01/18 09:46

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.602</b>		0.137	0.150		0.0957	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Actinium-227	0.262	U	0.380	0.381		0.479	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Bismuth-212	-0.522	U	0.811	0.813		0.636	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Bismuth-214</b>	<b>0.457</b>		0.124	0.133		0.0477	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Cesium-137	0.00286	U	0.0506	0.0506	0.0700	0.0415	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Cobalt-60	-0.00839	U	0.0578	0.0579	0.200	0.0282	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Lead-210	-0.132	U	1.27	1.27		1.02	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Lead-212</b>	<b>0.562</b>		0.0852	0.112		0.0367	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Lead-214</b>	<b>0.456</b>		0.128	0.137		0.0561	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Potassium-40</b>	<b>12.2</b>		1.36	1.84		0.226	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Protactinium-231	0.000	U	0.522	0.522		1.56	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Radium-226</b>	<b>0.457</b>		0.124	0.133	0.700	0.0477	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Radium-228</b>	<b>0.602</b>		0.137	0.150		0.0957	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Thallium-208</b>	<b>0.246</b>		0.0546	0.0602		0.0155	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Thorium-228</b>	<b>0.562</b>		0.0852	0.112		0.0367	pCi/g	08/10/18 13:35	08/31/18 08:58	1
<b>Thorium-232</b>	<b>0.602</b>		0.137	0.150		0.0957	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Thorium-234	0.396	U	0.609	0.610		0.873	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Uranium-235	-0.142	U	0.347	0.348		0.447	pCi/g	08/10/18 13:35	08/31/18 08:58	1
Uranium-238	0.396	U	0.609	0.610		0.873	pCi/g	08/10/18 13:35	08/31/18 08:58	1

## Client Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

Client Sample ID: PE2-RSYC4-DC-S015

Lab Sample ID: 160-30067-15

Date Collected: 08/01/18 09:51

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.889		0.232	0.248		0.0351	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Actinium-227	0.404	U	0.989	0.990		0.798	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Bismuth-212	0.0203	U	1.68	1.68		1.38	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Bismuth-214	0.908		0.184	0.206		0.0457	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Cesium-137	0.0291	U	0.0536	0.0537	0.0700	0.0404	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Cobalt-60	0.00738	U	0.0522	0.0522	0.200	0.0322	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Lead-210	-2.93	U	1.75	1.79		2.38	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Lead-212	0.632		0.121	0.138		0.0595	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Lead-214	0.822		0.182	0.200		0.0691	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Potassium-40	15.0		1.87	2.40		0.136	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Protactinium-231	-1.01	U	3.58	3.58		2.92	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Radium-226	0.908		0.184	0.206	0.700	0.0457	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Radium-228	0.889		0.232	0.248		0.0351	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Thallium-208	0.327		0.0955	0.101		0.0343	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Thorium-228	0.632		0.121	0.138		0.0595	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Thorium-232	0.889		0.232	0.248		0.0351	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Thorium-234	0.821	U	0.600	0.607		0.924	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Uranium-235	0.189	U	0.611	0.611		0.497	pCi/g	08/10/18 13:35	08/31/18 08:59	1
Uranium-238	0.821	U	0.600	0.607		0.924	pCi/g	08/10/18 13:35	08/31/18 08:59	1

Client Sample ID: PE2-RSYC4-DC-S016

Lab Sample ID: 160-30067-16

Date Collected: 08/01/18 09:56

Matrix: Solid

Date Received: 08/09/18 08:30

## Method: GA-01-R - Radium-226 &amp; Other Gamma Emitters (GS)

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
Actinium 228	0.694		0.179	0.193		0.0284	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Actinium-227	0.00359	U	0.0106	0.0106		0.463	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Bismuth-212	-0.0258	U	0.602	0.602		0.646	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Bismuth-214	0.733		0.137	0.157		0.0327	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Cesium-137	-0.0453	U	0.0759	0.0761	0.0700	0.0684	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Cobalt-60	0.0337	U	0.0152	0.0155	0.200	0.0450	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Lead-210	1.18		1.38	1.38		0.925	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Lead-212	0.717		0.110	0.144		0.0525	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Lead-214	0.568		0.145	0.157		0.0620	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Potassium-40	15.7		1.77	2.39		0.220	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Protactinium-231	-0.691	U	2.76	2.76		2.26	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Radium-226	0.733		0.137	0.157	0.700	0.0327	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Radium-228	0.694		0.179	0.193		0.0284	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Thallium-208	0.215		0.0720	0.0754		0.0313	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Thorium-228	0.717		0.110	0.144		0.0525	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Thorium-232	0.694		0.179	0.193		0.0284	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Thorium-234	0.245	U	1.29	1.29		1.05	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Uranium-235	0.105	U	0.316	0.316		0.256	pCi/g	08/10/18 13:35	08/31/18 09:10	1
Uranium-238	0.245	U	1.29	1.29		1.05	pCi/g	08/10/18 13:35	08/31/18 09:10	1

# Client Sample Results

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Client Sample ID: PE2-RSYC4-DC-S017**

**Lab Sample ID: 160-30067-17**

Date Collected: 08/01/18 10:01

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.495</b>		0.216	0.222		0.119	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Actinium-227	-0.528	U	1.12	1.13		0.722	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Bismuth-212	0.426	U	0.790	0.791		0.603	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Bismuth-214</b>	<b>0.689</b>		0.183	0.196		0.0721	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Cesium-137	-0.0303	U	0.0604	0.0604	0.0700	0.0666	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Cobalt-60	0.0271	U	0.0528	0.0529	0.200	0.0377	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Lead-210	0.0801	U	1.85	1.85		1.52	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Lead-212</b>	<b>0.666</b>		0.122	0.150		0.0584	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Lead-214</b>	<b>0.642</b>		0.142	0.156		0.0760	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Potassium-40</b>	<b>15.3</b>		2.05	2.58		0.305	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Protactinium-231	0.941	U	3.04	3.04		2.47	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Radium-226</b>	<b>0.689</b>		0.183	0.196	0.700	0.0721	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Radium-228</b>	<b>0.495</b>		0.216	0.222		0.119	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Thallium-208</b>	<b>0.232</b>		0.0735	0.0774		0.0239	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Thorium-228</b>	<b>0.666</b>		0.122	0.150		0.0584	pCi/g	08/10/18 13:35	08/31/18 09:14	1
<b>Thorium-232</b>	<b>0.495</b>		0.216	0.222		0.119	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Thorium-234	0.159	U	1.88	1.88		1.54	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Uranium-235	-0.0737	U	0.179	0.179		0.572	pCi/g	08/10/18 13:35	08/31/18 09:14	1
Uranium-238	0.159	U	1.88	1.88		1.54	pCi/g	08/10/18 13:35	08/31/18 09:14	1

**Client Sample ID: PE2-RSYC4-DC-S018**

**Lab Sample ID: 160-30067-18**

Date Collected: 08/01/18 10:06

Matrix: Solid

Date Received: 08/09/18 08:30

**Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)**

Analyte	Result	Qualifier	Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
			Uncert.	Uncert.						
			(2 +/-)	(2 +/-)						
<b>Actinium 228</b>	<b>0.877</b>		0.250	0.266		0.0663	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Actinium-227	-0.474	U	1.19	1.19		0.964	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Bismuth-212	-0.272	U	0.838	0.838		0.783	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Bismuth-214</b>	<b>0.660</b>		0.161	0.175		0.0589	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Cesium-137	0.0388	U	0.0637	0.0638	0.0700	0.0485	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Cobalt-60	0.0301	U	0.0910	0.0910	0.200	0.0436	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Lead-210</b>	<b>2.75</b>		2.08	2.11		1.21	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Lead-212</b>	<b>0.706</b>		0.130	0.149		0.0695	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Lead-214</b>	<b>0.681</b>		0.146	0.161		0.0652	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Potassium-40</b>	<b>19.0</b>		2.10	2.85		0.367	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Protactinium-231	0.0559	U	3.33	3.33		2.74	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Radium-226</b>	<b>0.660</b>		0.161	0.175	0.700	0.0589	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Radium-228</b>	<b>0.877</b>		0.250	0.266		0.0663	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Thallium-208</b>	<b>0.269</b>		0.0749	0.0797		0.0266	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Thorium-228</b>	<b>0.706</b>		0.130	0.149		0.0695	pCi/g	08/10/18 13:35	08/31/18 09:00	1
<b>Thorium-232</b>	<b>0.877</b>		0.250	0.266		0.0663	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Thorium-234	-0.0192	U	1.95	1.95		1.60	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Uranium-235	-0.268	U	0.754	0.754		0.615	pCi/g	08/10/18 13:35	08/31/18 09:00	1
Uranium-238	-0.0192	U	1.95	1.95		1.60	pCi/g	08/10/18 13:35	08/31/18 09:00	1

## QC Sample Results

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

### Method: 905.0 - Total Beta Strontium (GFPC)

**Lab Sample ID: MB 160-382925/11-A**  
**Matrix: Solid**  
**Analysis Batch: 387161**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 382925**

Analyte	MB MB		Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Total Beta Strontium	-0.01525	U	0.0722	0.0722	0.331	0.0607	pCi/g	08/16/18 12:28	09/05/18 05:46	1
Carrier	MB MB		Limits				Prepared	Analyzed	Dil Fac	
	%Yield	Qualifier								
Sr Carrier	70.7		40 - 110				08/16/18 12:28	09/05/18 05:46	1	

**Lab Sample ID: LCS 160-382925/1-A**  
**Matrix: Solid**  
**Analysis Batch: 387161**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 382925**

Analyte	Spike Added	LCS Result	LCS Qual	Total	LOQ	DLC	Unit	%Rec	%Rec. Limits
				Uncert. (2 +/-)					
Total Beta Strontium	8.20	8.112		0.699	0.331	0.0764	pCi/g	99	75 - 125
Carrier	LCS %Yield	LCS Qualifier	Limits						
Sr Carrier	55.1		40 - 110						

### Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS)

**Lab Sample ID: MB 160-381607/1-A**  
**Matrix: Solid**  
**Analysis Batch: 386488**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 381607**

Analyte	MB MB		Count	Total	LOQ	DLC	Unit	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Uncert.	Uncert.						
Actinium 228	0.05465	U	0.226	0.226		0.118	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Actinium-227	-0.03204	U	0.423	0.423		0.289	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Bismuth-212	0.3679	U	0.787	0.788		0.588	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Bismuth-214	-0.03323	U	0.105	0.105		0.201	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Cesium-137	-0.02713	U	0.0614	0.0615	0.0700	0.0431	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Cobalt-60	0.03145		0.0247	0.0249	0.200	0.0218	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Lead-210	-0.4517	U	1.30	1.30		0.979	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Lead-212	0.01448	U	0.0886	0.0887		0.0711	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Lead-214	0.02466	U	0.125	0.125		0.0748	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Potassium-40	0.1799	U	0.615	0.615		0.447	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Protactinium-231	0.4564	U	1.69	1.69		1.91	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Radium-226	-0.03323	U	0.105	0.105	0.700	0.201	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Radium-228	0.05465	U	0.226	0.226		0.118	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Thallium-208	0.01660	U	0.0474	0.0474		0.0258	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Thorium-228	0.01448	U	0.0886	0.0887		0.0711	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Thorium-232	0.05465	U	0.226	0.226		0.118	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Thorium-234	-0.4077	U	0.769	0.770		0.665	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Uranium-235	0.1025	U	0.251	0.252		0.172	pCi/g	08/10/18 13:35	08/31/18 07:10	1
Uranium-238	-0.4077	U	0.769	0.770		0.665	pCi/g	08/10/18 13:35	08/31/18 07:10	1

# QC Sample Results

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

## Method: GA-01-R - Radium-226 & Other Gamma Emitters (GS) (Continued)

**Lab Sample ID: LCS 160-381607/2-A**  
**Matrix: Solid**  
**Analysis Batch: 386490**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 381607**

Analyte	Spike Added	LCS Result	LCS Qual	Total Uncert. (2 +/-)	LOQ	DLC	Unit	%Rec	%Rec. Limits
Americium-241	96.8	104.8		11.0		0.566	pCi/g	108	87 - 116
Cesium-137	28.2	28.62		3.06	0.0700	0.0849	pCi/g	102	87 - 120
Cobalt-60	12.8	12.50		1.32	0.200	0.0694	pCi/g	98	87 - 115

**Lab Sample ID: 160-30067-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 386488**

**Client Sample ID: PE2-RSYC4-DC-S001**  
**Prep Type: Total/NA**  
**Prep Batch: 381607**

Analyte	Sample Result	Sample Qual	DU Result	DU Qual	Total Uncert. (2 +/-)	LOQ	DLC	Unit	RER	RER Limit
Actinium 228	0.838		1.033		0.321		0.0834	pCi/g	0.39	1
Actinium-227	-0.219	U	0.2716	U	0.480		0.493	pCi/g	0.45	1
Bismuth-212	-0.356	U	0.4804	U	1.33		1.06	pCi/g	0.40	1
Bismuth-214	0.682		0.8325		0.211		0.0605	pCi/g	0.42	1
Cesium-137	-0.0441	U	0.007409	U	0.0705	0.0700	0.0571	pCi/g	0.36	1
Cobalt-60	0.0417		0.07282		0.0445	0.200	0.0154	pCi/g	0.45	1
Lead-210	0.605	U	-0.1137	U	1.59		1.13	pCi/g	0.25	1
Lead-212	0.867		0.8347		0.169		0.0564	pCi/g	0.10	1
Lead-214	0.810		0.7858		0.179		0.0530	pCi/g	0.07	1
Potassium-40	11.0		12.06		2.22		0.316	pCi/g	0.28	1
Protactinium-231	-0.805	U	0.0000	U	0.565		2.66	pCi/g	0.24	1
Radium-226	0.682		0.8325		0.211	0.700	0.0605	pCi/g	0.42	1
Radium-228	0.838		1.033		0.321		0.0834	pCi/g	0.39	1
Thallium-208	0.283		0.4013		0.0977		0.0194	pCi/g	0.72	1
Thorium-228	0.867		0.8347		0.169		0.0564	pCi/g	0.10	1
Thorium-232	0.838		1.033		0.321		0.0834	pCi/g	0.39	1
Thorium-234	0.203	U	0.1291	U	1.43		1.17	pCi/g	0.03	1
Uranium-235	0.0998	U	0.05540	U	0.184		0.260	pCi/g	0.11	1
Uranium-238	0.203	U	0.1291	U	1.43		1.17	pCi/g	0.03	1

# QC Association Summary

Client: Aptim Federal Services LLC  
Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

## Rad

### Leach Batch: 381446

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30067-1	PE2-RSYC4-DC-S001	Total/NA	Solid	Dry and Grind	
160-30067-2	PE2-RSYC4-DC-S002	Total/NA	Solid	Dry and Grind	
160-30067-3	PE2-RSYC4-DC-S003	Total/NA	Solid	Dry and Grind	
160-30067-4	PE2-RSYC4-DC-S004	Total/NA	Solid	Dry and Grind	
160-30067-5	PE2-RSYC4-DC-S005	Total/NA	Solid	Dry and Grind	
160-30067-6	PE2-RSYC4-DC-S006	Total/NA	Solid	Dry and Grind	
160-30067-7	PE2-RSYC4-DC-S007	Total/NA	Solid	Dry and Grind	
160-30067-8	PE2-RSYC4-DC-S008	Total/NA	Solid	Dry and Grind	
160-30067-9	PE2-RSYC4-DC-S009	Total/NA	Solid	Dry and Grind	
160-30067-10	PE2-RSYC4-DC-S010	Total/NA	Solid	Dry and Grind	
160-30067-11	PE2-RSYC4-DC-S011	Total/NA	Solid	Dry and Grind	
160-30067-12	PE2-RSYC4-DC-S012	Total/NA	Solid	Dry and Grind	
160-30067-13	PE2-RSYC4-DC-S013	Total/NA	Solid	Dry and Grind	
160-30067-14	PE2-RSYC4-DC-S014	Total/NA	Solid	Dry and Grind	
160-30067-15	PE2-RSYC4-DC-S015	Total/NA	Solid	Dry and Grind	
160-30067-16	PE2-RSYC4-DC-S016	Total/NA	Solid	Dry and Grind	
160-30067-17	PE2-RSYC4-DC-S017	Total/NA	Solid	Dry and Grind	
160-30067-18	PE2-RSYC4-DC-S018	Total/NA	Solid	Dry and Grind	
160-30067-1 DU	PE2-RSYC4-DC-S001	Total/NA	Solid	Dry and Grind	

### Prep Batch: 381607

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30067-1	PE2-RSYC4-DC-S001	Total/NA	Solid	Fill_Geo-21	381446
160-30067-2	PE2-RSYC4-DC-S002	Total/NA	Solid	Fill_Geo-21	381446
160-30067-3	PE2-RSYC4-DC-S003	Total/NA	Solid	Fill_Geo-21	381446
160-30067-4	PE2-RSYC4-DC-S004	Total/NA	Solid	Fill_Geo-21	381446
160-30067-5	PE2-RSYC4-DC-S005	Total/NA	Solid	Fill_Geo-21	381446
160-30067-6	PE2-RSYC4-DC-S006	Total/NA	Solid	Fill_Geo-21	381446
160-30067-7	PE2-RSYC4-DC-S007	Total/NA	Solid	Fill_Geo-21	381446
160-30067-8	PE2-RSYC4-DC-S008	Total/NA	Solid	Fill_Geo-21	381446
160-30067-9	PE2-RSYC4-DC-S009	Total/NA	Solid	Fill_Geo-21	381446
160-30067-10	PE2-RSYC4-DC-S010	Total/NA	Solid	Fill_Geo-21	381446
160-30067-11	PE2-RSYC4-DC-S011	Total/NA	Solid	Fill_Geo-21	381446
160-30067-12	PE2-RSYC4-DC-S012	Total/NA	Solid	Fill_Geo-21	381446
160-30067-13	PE2-RSYC4-DC-S013	Total/NA	Solid	Fill_Geo-21	381446
160-30067-14	PE2-RSYC4-DC-S014	Total/NA	Solid	Fill_Geo-21	381446
160-30067-15	PE2-RSYC4-DC-S015	Total/NA	Solid	Fill_Geo-21	381446
160-30067-16	PE2-RSYC4-DC-S016	Total/NA	Solid	Fill_Geo-21	381446
160-30067-17	PE2-RSYC4-DC-S017	Total/NA	Solid	Fill_Geo-21	381446
160-30067-18	PE2-RSYC4-DC-S018	Total/NA	Solid	Fill_Geo-21	381446
MB 160-381607/1-A	Method Blank	Total/NA	Solid	Fill_Geo-21	
LCS 160-381607/2-A	Lab Control Sample	Total/NA	Solid	Fill_Geo-21	
160-30067-1 DU	PE2-RSYC4-DC-S001	Total/NA	Solid	Fill_Geo-21	381446

### Prep Batch: 382925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-30067-1	PE2-RSYC4-DC-S001	Total/NA	Solid	DPS-0	381446
160-30067-11	PE2-RSYC4-DC-S011	Total/NA	Solid	DPS-0	381446
MB 160-382925/11-A	Method Blank	Total/NA	Solid	DPS-0	
LCS 160-382925/1-A	Lab Control Sample	Total/NA	Solid	DPS-0	

## Tracer/Carrier Summary

Client: Aptim Federal Services LLC  
 Project/Site: Hunters Point Naval Shipyard - Parcel E2

TestAmerica Job ID: 160-30067-2

**Method: 905.0 - Total Beta Strontium (GFPC)**

**Matrix: Solid**

**Prep Type: Total/NA**

**Percent Yield (Acceptance Limits)**

Lab Sample ID	Client Sample ID	Sr Carrier (40-110)
160-30067-1	PE2-RSYC4-DC-S001	80.7
160-30067-11	PE2-RSYC4-DC-S011	72.9
LCS 160-382925/1-A	Lab Control Sample	55.1
MB 160-382925/11-A	Method Blank	70.7

**Tracer/Carrier Legend**

Sr Carrier = Sr Carrier

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